

THE PRACTITIONER

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THE

PRACTITIONER

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JANUARY

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Our Diamond Jubilee.

IT is sixty years since THE PRACTITIONER was ushered into existence with great expectations of an auspicious career. The hopes of its sponsors were well founded, for the journal came into being with the dawn of a new era in medical history, and, along with the imminent prospect of world-stirring results of medical investigations then proceeding, there was abundant work in view for the professional Press in forwarding a strenuous search for the deadly secrets of disease.

Yet, though the hopes for its future have been amply justified, THE PRACTITIONER had to share the common lot of new-born publications of the period. It had to struggle through the many perils of journalistic infancy and pass an adolescence of inconspicuous usefulness before professional appreciation of its worth advanced it to the influential position it holds to-day.

THE PRACTITIONER was born at a period of unprecedented advancement in all spheres of medical activity, and at the time of its birth Lister was bringing his invaluable discovery—which all civilization must keep in grateful remembrance—into full operation, thus placing the copestone on Simpson's beneficent labours and gaining for operative surgery the first triumph of the new age.

In 1890 the sunlight treatment in disease was

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first announced in this journal by its originator, Dr. T. A. Palm. This was a great advance in medical science, and one destined to lead to many developments. The application of sunrays was the forerunner of many inventions designed for the cure of painful and disfiguring ailments, and its developments are far from being exhausted.

Meanwhile, the pioneers of pathological progress were devoting their greatest energies to a quest for the origins of the virulent pests which were then levying an appalling toll of human life, unchecked by any measures that medical knowledge could array against them. The search for the causes of consumption and malaria was a heavy task, but the end was triumphantly attained. In this inestimable service on behalf of suffering humanity THE PRACTITIONER took a conspicuous part.

In 1898 the treatment of tuberculosis, in the light of the new discoveries, became a matter of urgent importance, and THE PRACTITIONER devoted all its influence to the promotion of the first practical campaign against the universal scourge. A special number, dealing with every phase of the disease and earnestly insisting on the necessity for drastic action, had awakened the thinking portion of the nation to the gravity of the emergency, and the outcome of this crusade was a meeting held at Marlborough House on December 20, 1898, under the presidency of King Edward, then Prince of Wales. The Prime Minister was present, and most of the official heads of the medical profession, together with a host of well-known public men. The result of the meeting was the birth of the National Association for the Prevention of Consumption and other forms of Tuberculosis, and it was at this memorable gathering that the Prince of Wales thanked Messrs. Wernher & Co. for their gift of £20,000 to the new sanatorium.

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Three years later, THE PRACTITIONER returned to the charge owing to the seriousness of the national menace, and another "cloud of witnesses" advocated the pressing need for adequate assistance—particularly in the direction of preventive steps—from public authorities. But the Government maintained its original attitude of "benevolent neutrality," and the municipal boards considered the suppression of tuberculosis no business of theirs. Undiscouraged by governmental apathy and undeterred by the penny-wisdom of local administrators, the Association continued to press forward the good work, not only without official aid, but without the enthusiastic popular co-operation which a lead from high authorities can command. The movement had, perforce, to adopt *festina lente* as its motto, but the seed sown by THE PRACTITIONER has yielded a wonderful harvest.

A special number was also devoted to cancer with a view to forwarding the search for the cause of this terrible affliction. This number first gave particulars to the world of the Plimmer bodies, which caused a great sensation at that time. There is reason to hope that the solution of the problem, which all civilization anxiously awaits, will soon be found.

As the discovery of the real origin of malaria, and of an effective remedy for the so-called "miasmatic fever" became widely known, the demand for information and guidance extended, literally, to the farthest corners of the earth. A special number of THE PRACTITIONER devoted to malaria was therefore issued about the time that Sir Ronald Ross had succeeded in tracing the cause of the disease to the anopheles mosquito. The special number was an epoch-making contribution to the knowledge of the subject, and its value, as an authority, received world-wide recognition. Malaria was then claiming an incalculable number of victims in the British Possessions and Depend-

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undertakings. That it has been conspicuously successful is attested, not only by its prosperity, but by the growing favour it has won from the leaders of the profession in all parts of the world.

In our day the journal has not lost anything of its old repute. On the contrary, the constant assurances of appreciation we have received bear testimony to an ever-increasing influence and popularity. For this great measure of success we are much indebted, in the first place, to the brilliant succession of pioneers of thought who have passed through our Editorial Chair. Among these we may name Sir Donald MacAlister (now President of the General Medical Council), Sir Lauder Brunton, Sir Malcolm Morris, and, until recently, Sir Arbuthnot Lane; and we have, further, to give due credit to the great company of talented contributors—a list much too long to detail—whose articles have sustained the reputation of **THE PRACTITIONER** as an intellectual journal.

We cannot close this record of journalistic participation in the great achievements of advancing medicine, during sixty fruitful years, without adding a few words concerning the more intimate aspect of our professional service. In this regard we have not claims to assert, but generous help and encouragement to acknowledge. We have already received greetings and congratulations on our Diamond Jubilee, but, although these are specially acceptable, because addressed to a special occasion, they do not differ in spirit from the kindly letters we receive from time to time. For all these assurances of approval and goodwill—a most gratifying addition to the material support which **THE PRACTITIONER** has enjoyed in full measure—we desire to express our sincerely grateful thanks.

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encies alone. In India the mortality due, directly or indirectly, to the disease amounted each year to two millions. Thanks to Ross's momentous discovery, the reduction of this dreadful tax on India's population is now assured. At Port Swettenham, a new seaport created by British enterprise for the benefit of the Malay States rubber trade, the death-rate from parasitic disease became so enormous that the abandonment of the prosperous port was under consideration when the Ross discovery came to the rescue and the disease was practically stamped out. The same methods were of immense service at the construction of the Panama Canal, when the ravages of malaria among the workers had previously brought operations to a standstill. In many other areas work of a value beyond computation is being steadily carried on, but, as the organizers of the campaign against the mosquito have pointed out, the medical vanguard cannot, unaided, achieve a complete victory. The destruction of the vast breeding grounds of the mosquito will require the co-operation of a powerful auxiliary force directed by engineering genius.

In more recent years the outstanding events in the history of the journal might be said to belong to the history of the Great War. In that time of imperative need for efficient assistance the efforts of THE PRACTITIONER were, naturally, concentrated upon helpful service in the medical sphere of activity. The journal went out to nearly every medical officer in the war-field and reached the farthest outposts of British occupation. Our special war numbers were supplied by order to the fighting forces afloat and ashore, and were afterwards esteemed worthy of a place in the Imperial War Museum.

That THE PRACTITIONER has survived to celebrate its Diamond Jubilee is, in itself, an evidence that it has acted well its part and honourably discharged its

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malaria, mentioned in the Editorial survey, illustrates the practical manifestations of the broad conception of treatment—for the benefit not only of the individual, but of the nation.

Ever on the alert to bring forward the new and the true advances in medical science, special numbers of THE PRACTITIONER have often been devoted to subjects of particular interest. Some of these subjects, such as blood-pressure, high and low, climatology (1908), heart disease, rheumatoid diseases (1912), gout, influenza (1907, 1919), were of universal and immediate acceptance, but in others the germ, though early planted in these pages, was slow in development; for example, the sunlight treatment of disease, first brought before the medical readers in this country by Dr. T. A. Palm in 1890. In addition, reference may perhaps be directed to the series of papers on pernicious anaemia by Dr. William Hunter in the late 'eighties and early 'nineties, during the editorship of Sir Donald MacAlister, out of which grew the now universally accepted importance of oral sepsis and focal infection in the production of many diseases.

The fiftieth year of THE PRACTITIONER coincided with the last year of the war, in the January of which its hundredth volume began, and therefore was not the time for any celebration, such as is now so appropriate in its sixtieth year of unabated activity, but it was marked in a more excellent way, for special war numbers of the journal reached nearly every medical man in the fighting forces. In conclusion, no better wish can be expressed than that THE PRACTITIONER will continue on the same lines that have brought it such deserved success in the past.

An Appreciation.

BY SIR HUMPHRY ROLLESTON, BART., K.C.B., M.D.

Physician in Ordinary to His Majesty the King; Regius Professor of Physic in the University of Cambridge; Emeritus Physician to St. George's Hospital; late President, Royal College of Physicians, etc.

IT is a very pleasant privilege to congratulate THE PRACTITIONER not only on its Diamond Jubilee, but also on its youthful vigour in maintaining the object, with which it was founded, of advancing the scientific study of therapeutics. The introduction to the first number in July 1868 quoted, from the Presidential Address to the first meeting of the old Clinical Society of London, Sir Thomas Watson's then recent dictum that "Certainly the greatest gap in the science of medicine is to be found in its final and supreme stage—the stage of therapeutics."

The members of the medical profession have thus become its debtor, and in their gratitude the memory of Francis Edmund Anstie (1833-74), physician to the Westminster Hospital, should not be forgotten; for he was Joint Editor with Henry Lawson, Assistant Physician to St. Mary's Hospital, at the start, and after the first year its sole Editor, and, being actively concerned with the advancement of therapeutics and the problems of public health, wisely framed and directed the policy of this journal, so successfully continued and expanded since its first appearance.

Anstie was an independent authority on stimulants and narcotics, and among the numerous symposiums, which have been such an attractive feature of THE PRACTITIONER, these subjects of perennial interest have, from time to time, reflected the changing opinion of the medical profession. The part the journal played in the campaigns against tuberculosis, cancer and

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of the caffeine is taken out by the first infusion. It may be desirable to dilute the later infusions because of their tannin content, but it is not necessary to dilute quite a strong cup from a first infusion.

There is not the slightest doubt that caffeine has a considerable stimulating action, as is seen by the increased heart-rate and the increased reflex time. Psychologists are agreed that thought is generally clearer and quicker; drowsiness, if present, is made to disappear, and fatigue is delayed, while the senses are generally more acute. Caffeine is, therefore, an excellent antidote to narcotic poisoning, such as that by alcohol or morphia. Of special interest is the possibility of there being a period of depression following the stimulating effect of caffeine, and on this point the work of Hollingworth is specially instructive. He carried out tests, such as typewriting, the naming of colours, the cancellation of certain letters in a page of print, and calculations, and found that in every instance there was benefit from a dose of caffeine approximately equivalent to an average cup of freshly-made tea. It is particularly interesting to observe that he found the effects, especially the mental effects, which began within the first hour might last for several hours. He did not, however, find any evidence of depression subsequent on a purely stimulating dose, although tests were repeated at intervals up to seven hours.

Caffeine appears to have a general metabolic stimulating action on muscle, causing the glycogen content to be reduced and heat to be liberated, and this no doubt accounts for the general increase in metabolism which has been found.

The action of caffeine on the heart appears to be a direct one on the pacemaker. It is, however, important as it may cause a rise of blood pressure, which may lead to erroneous conclusions if the pressure be taken after the consumption of tea. Caffeine is also

The Physiological Action of Tea as a Beverage.

By R. J. S. McDOWALL, D.Sc., M.B., F.R.C.P.

Professor of Physiology, University of London, King's College.

THE ever-increasing use of tea as a beverage makes us wonder whither we are going in this cultivation of the tea-drinking habit, for a habit it surely is, and causes us to reflect as to how far it may be considered harmful or otherwise; particularly as, from time to time, patients or their friends may ask for advice.

It is not generally understood in the popular mind that the essential stimulating principle of both tea and coffee is the same—namely, caffeine, which is present in the dried tea leaf to the extent of 2 or 3 per cent. The caffeine content of a strong cup of tea, e.g., made from 5 grms. of leaves, or of coffee, e.g., made from 15–17 grms. of berries, is practically the same (0·1 grm.). Both have, however, certain other substances which are of some importance. Coffee has, for example, fat and chlorogenic acid, while tea has tannin and theobromine.

For practical purposes we may consider caffeine and tannin as the most important substances in tea. In no sense can tea be considered a food. Many of the better teas contain quite as much tannin as the cheaper qualities. The extent to which tannin or caffeine may be extracted depends almost entirely upon the way in which the tea is made; the longer the tea is infused the greater the amount of tannin extracted; while quite a brief infusion extracts practically all the available caffeine. As a corollary to this statement, it is evident that the idea of diluting strong and stale tea for second cups is quite fallacious, since the majority

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be deprecated because of the astringent effects on the mucous membrane in that organ and in the upper part of the small intestine. Advantage, indeed, is often taken of this effect of tannin by its use in diarrhœa mixtures, but it is probable that its effect is more marked on inflamed mucous membrane than on normal. It is very difficult to say that tea, and certain wines, are definitely responsible for constipation, but at the same time there is no doubt that the possibility exists, and in this respect coffee is to be preferred. The latter has, however, the disadvantage that the oils which it contains may cause hyperacidity.

We may conclude, then, that, so far as we know, the moderate consumption of properly made tea has no serious disadvantages and that, taken with meals, it acts as a useful antagonist to the somewhat soporific effect of the meal itself. It is, however, to be considered essentially a luxury; of no real value, except that it promotes a sense of well-being. Its bad effects if taken in excess, or if too long infused, may, in some people, be considerable; although, fortunately, these effects are never permanent and disappear if the supply is reduced. Tea may be judged by its flavour. An unusual bitterness suggests excessive tannin, especially if accompanied with a local astringent effect in the mouth. Caffeine itself, however, is slightly bitter.

An important practical point is that where tea has to be made in large vessels which require to be replenished from time to time, some method must be adopted to remove the used tea-leaves readily by having, for example, the tea suspended in small muslin bags or in a special wire-gauze chamber. When urns are in use the tea should be made in teapots by rapid infusion with boiling water and poured into the larger vessels, which may then be kept heated as required.

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a valuable diuretic acting on the kidney. The action appears to be directly on the glomeruli rather than on the tubules, and unless administered in large doses does not appear to be harmful to that organ. Diuretin is a very closely related substance chemically, to which sodium salicylate has been added. This diuretic effect, together with the action on the heart, makes caffeine a useful adjuvant to the more usual cardiac tonics in oedema, and since, even in such patients, a certain amount of fluid is necessary to promote intestinal absorption, tea is a very convenient form in which the caffeine may be administered.

The effects on the central nervous system are, however, by far the most striking, the more so as there is little doubt that caffeine may with advantage be used as a stimulant for special occasions. For example, it has definitely been shown that it causes a marked augmentation of all conditioned reflexes, making them at the same time more stable and less easily inhibited.

The disadvantages of tea lie in its excessive consumption and in the possibility of bad preparation. In excess, the caffeine may bring about nervous excitation with tremors and disturbed sleep, headache and general mental inefficiency. According to Ballard, the effects of excess might, especially in a young person, be produced by five cups of tea per day.

More common, however, are the results from the tannin of tea too long infused. Dyspepsia is the characteristic symptom. Cushny has shown that the digestive enzymes may be considerably reduced by tea, and Pavlov found a distinct reduction of gastric secretion. Of special importance is the fact that the tannin of tea is astringent in virtue of its power to precipitate protein. When taken with food and with milk any deleterious effects which it may have are appreciably reduced, but, on the other hand, the taking of badly made tea on an empty stomach is to

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Chronic Arthritis and its Treatment.

By W. H. WYNN, M.D., M.Sc., F.R.C.P.

Professor of Medicine in the University of Birmingham; Physician to the General Hospital, Birmingham, etc.

CHRONIC rheumatism is a major form of ill-health, responsible for an enormous amount of suffering and working incapacity; 370,000 insured patients seek treatment for it in a year, and there is an annual loss of 3,000,000 weeks of work. Chronic arthritis accounts for only one-third of these cases, but from its longer duration and greater crippling effect it causes as much incapacity and economic loss as all the other forms of rheumatism combined.

The classification of arthritis is at present in a confused state. But after separating out the cases due to specific infections, such as tuberculosis, gonorrhœa, dysentery, etc., and the rarer cases due to haemophilia and intermittent hydrarthrosis, there remains a group of non-specific joint disorders which lead to crippling and to which the inclusive term, *arthritis deformans*, can rightly be applied. Within this group three main classes can be recognized: rheumatoid or atrophic arthritis, osteo- or hypertrophic arthritis, fibroarthritis or infective periarthritis. Whilst typical examples of each present distinct clinical and pathological features, there are cases difficult to classify and others in which more than one type is seen in the same patient. Rheumatoid arthritis, though the least common, is in many ways the most important of the three. The name should be restricted to one well-defined group which has received several classical descriptions, and should not be used in a general

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sense as synonymous with *arthritis deformans*.

This classification will be better understood after a brief reference to the morbid anatomy. In *rheumatoid arthritis* the disease commences in the synovial membrane, which becomes swollen and hyperæmic. The synovial villi proliferate and there is an increase of synovial fluid. At first there is no change in the bone or cartilage, but gradually the cartilage becomes rough, atrophies, and wears away, so exposing the underlying bone. Granulation tissue spreads over the articular surfaces from the adjacent synovial membrane so that finally there may be fibrous, cartilaginous or bony ankylosis. The bones neighbouring the joints are thinned and so may easily be fractured if forcible attempts are made to straighten the joints. The muscles shorten and waste so that contractures are produced. The final stage is one of atrophy of all the structures of the joints with some ankylosis and contracture.

In *osteoarthritis* the first change is in the central area of the cartilage which is farthest from the blood supply. The cartilage loses its translucency and undergoes fibrillation with atrophy of the matrix and some proliferation of cells. The increase of cells is most marked at the periphery where the proliferation of cartilage and underlying bone unite in the formation of osteophytes. As the cartilage in the centre atrophies the underlying bone scleroses and becomes eburnated. At first there is but little change in the synovial membrane, but after a time villi form around the articular margin with increased vascularity and hyperplasia. Sometimes the villi are very large and numerous so that the inside of the joint has a shaggy appearance. If the villous enlargement occurs early, before the bony changes are marked, we have the condition of *villous synovitis*, best seen in the knees. The villi may become loaded with fat and resemble a

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It occurs equally among rich and poor. It is found in fashionable spas and in poor-law infirmaries. In its etiology we find prominent those factors which seriously weaken the general health: frequent pregnancies, excessive menstruation, prolonged strain, worry and anxiety. Occasionally a sudden shock seems to determine the onset. I had one patient in whom it immediately followed a railway accident; she herself escaped injury, but suffered intensely from shock. I have seen it follow motor accidents or the death of a near relative, especially when this was preceded by a long period of arduous nursing. Heredity seems to play some part, as not infrequently we find arthritis in several members of a family.

It is clear that these are only predisposing factors, and the true cause, i.e. the cause in whose absence the disease will not occur, remains to be discovered. The infective theory has strong claims. Micro-organisms have been found in the joints, but not with the constancy required of a specific infection. In recent years great emphasis has been placed upon the importance of focal infections, and so pyorrhœa, alveolar abscesses, septic tonsils, infection of the paranasal sinuses, and infections connected with the alimentary and genito-urinary tracts have been incriminated. Focal infections are of great importance in connection with fibroarthritis and other forms of fibrosis and also with osteoarthritis, but there is no evidence that they can cause a true rheumatoid arthritis. Infection is doubtless an important factor in rheumatoid arthritis, but it is to be sought in a widespread absorption from a mucous membrane rather than in some small infective focus. And infection is not the primary fault. This is to be found in a condition of the mucous membrane, which lowers its resistance to invasion by germs and so gives rise to a subinfection. The fault is primarily in the soil rather than the seed. How is this defect

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group of lipomata, or cartilage may form in them. At a later stage in osteoarthritis there is sclerosis of the synovial membrane and capsule.

The changes in the joints suggest the action of a chronic irritant, either toxic in origin or caused by a series of small injuries or strains. The disease is often regarded as degenerative, but the changes are really those of proliferation and hypertrophy. Osteoarthritis must be regarded as a series of changes that ensue when a joint is subjected to prolonged or oft-repeated irritation and the causes are manifold.

With *fibroarthritis* the changes occur in the capsule and fibrous structures around the joint. At first there may be only small fibrositic nodules, but when well marked there are widespread changes involving the capsule and the surrounding tendons which may become glued to the capsule. The inflammation may spread to the synovial membrane with outpouring of effusion and the formation of villi. Changes in the bone and cartilage are not seen except when the inflammation is very intense. The disease is often confused with rheumatoid arthritis, especially when it attacks the small joints of the hands; but rheumatoid arthritis is symmetrical, whereas fibroarthritis picks out a joint here and there.

To sum up, rheumatoid arthritis begins in the synovial membrane, osteoarthritis in the cartilage, and fibroarthritis in the capsule. Crippling in rheumatoid arthritis is due to muscular contracture and atrophy of joints plus ankylosis, in osteoarthritis to osteophytes, and in fibroarthritis to fibrous contraction.

Having obtained a clear idea of the actual changes in the joints we shall discuss the clinical features of each type separately.

Rheumatoid arthritis is found chiefly in young adults and most often in females. It may occur in children as Still's disease and is not uncommon in the elderly.

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of the mucous membrane caused? In some cases it appears to be inherited, and we are all familiar with patients who from their earliest years appear to have an increased susceptibility to infection of their mucous membranes, who have what may be termed a "catarrhal" or "mucous diathesis." But in most cases it is probably acquired, and the interesting suggestion has been made that it is due to a deficiency of vitamins. It has been shown by Cramer that a deficiency of vitamin A, and by Rowlands that a deficiency of vitamin B, in animals will cause an atrophy of the intestinal mucous membrane with resulting stasis and passage of organisms into the lymphatics. This deficiency may be due to a diet with insufficient vitamin content or to faulty assimilation of a diet with sufficient vitamins. We do not yet know how far these results can be applied to human beings, but intestinal stasis and alteration of the intestinal flora are found in rheumatoid arthritis and further evidence of alimentary absorption is shown by the presence of *B. coli* and intestinal streptococci in the urine.

There is also a disturbance of the endocrine secretions. During the active phases of the disease there is usually evidence of hyperthyroidism. Hyperthyroidism causes a lowered sugar tolerance, and lowered sugar tolerance not only aids infection but is also caused by infections, shock, anxiety and worry, so that a vicious circle is set up. Another important fact is that many patients have hypochlorhydria, and this increases the possibility of a gross infection of the small intestine, especially in the presence of swallowed septic material.

Whatever the real underlying fault may be, and it is probable that the same end is arrived at by different paths, it is evident that with rheumatoid arthritis we are dealing with a general disease with profound metabolic disturbances and that the joint disorders are but local and often late manifestations. This is

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also shown by a group of symptoms which constantly occur with the arthritis and may precede its onset by years :—(1) Vasomotor irritability. The pulse is rapid and unstable and the blood pressure is low. Hands and feet are at times blue and swollen and at others cold and pallid, almost resembling those of Raynaud's disease. Indeed, Raynaud's disease is occasionally associated. There is increased sweating of the palms and soles of the feet, and sweat drops from the axillæ and runs down the groove of the spine. It has been suggested that the disturbance of the peripheral circulation is due to capillary spasm followed by stasis under the influence of cold, damp and endocrine faults. (2) There is a characteristic pigmentation. The patient is dark under the eyes and has light brown smears on the face, especially over the forehead. Dark brown spots like freckles and often larger splashes of pigment are found on the limbs, especially on the forearms. (3) Paræsthesiæ occur in the shape of tingling sensations in the hands and feet, "pins and needles," and muscular cramps. Trophic changes in the muscles may precede the arthritis.

These early symptoms are of great diagnostic importance, and if their significance were always recognized we might do much to prevent the later development of joint changes.

The onset of rheumatoid arthritis is acute or subacute. When acute it is often mistaken for acute rheumatism, but in this disease the arthritis does not last in any one joint more than a few days. It flits from joint to joint, whereas in rheumatoid arthritis once a joint is attacked it persists there and it is doubtful if complete resolution ever takes place. Rheumatic joints respond promptly to treatment with salicylates which have no effect on rheumatoid joints. More often the disease has a subacute onset with moderate pyrexia and there are exacerbations and remissions alternating

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of the mucous membrane caused? In some cases it appears to be inherited, and we are all familiar with patients who from their earliest years appear to have an increased susceptibility to infection of their mucous membranes, who have what may be termed a "catarrhal" or "mucous diathesis." But in most cases it is probably acquired, and the interesting suggestion has been made that it is due to a deficiency of vitamins. It has been shown by Cramer that a deficiency of vitamin A, and by Rowlands that a deficiency of vitamin B, in animals will cause an atrophy of the intestinal mucous membrane with resulting stasis and passage of organisms into the lymphatics. This deficiency may be due to a diet with insufficient vitamin content or to faulty assimilation of a diet with sufficient vitamins. We do not yet know how far these results can be applied to human beings, but intestinal stasis and alteration of the intestinal flora are found in rheumatoid arthritis and further evidence of alimentary absorption is shown by the presence of *B. coli* and intestinal streptococci in the urine.

There is also a disturbance of the endocrine secretions. During the active phases of the disease there is usually evidence of hyperthyroidism. Hyperthyroidism causes a lowered sugar tolerance, and lowered sugar tolerance not only aids infection but is also caused by infections, shock, anxiety and worry, so that a vicious circle is set up. Another important fact is that many patients have hypochlorhydria, and this increases the possibility of a gross infection of the small intestine, especially in the presence of swallowed septic material.

Whatever the real underlying fault may be, and it is probable that the same end is arrived at by different paths, it is evident that with rheumatoid arthritis we are dealing with a general disease with profound metabolic disturbances and that the joint disorders are but local and often late manifestations. This is

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of the fingers. If the proximal joints are attacked it is always in association with osteophytes, the so-called Heberden's nodes on the terminal joints. The general health is less disturbed and patients may be stout and plethoric with high blood-pressure and thickened arteries. The onset is with pain which may be referred to the joint itself or to neighbouring parts. Sciatic pain is often the first sign of an osteoarthritis of the hip or sacro-iliac joint. The pain may be absent on rest but brought on when pressure is placed on the joint by standing or walking.

Another condition often regarded as a special form of arthritis is *villous synovitis*, in which there is marked hypertrophy of synovial villi. It occurs most commonly in women about the climacteric period. The knees are swollen and on palpation a peculiar crackling is felt, due to the friction of the villi. Similar changes may occur in the hips and it is often associated with sacro-iliac relaxation and flat feet. The chief factor in its production is probably static strain occurring in patients who do much standing and have increased in weight from obesity, hypothyroidism, pregnancy, etc. It may be regarded as a variety of osteoarthritis in which there is excessive synovial proliferation.

Fibroarthritis is a form of fibrositis, a chronic inflammation of fibrous tissue. The mildest form is an arthralgia—fleeting attacks of pain in three or four joints. There is no swelling or other alteration in the appearance of the joints and the pain subsides in a few days. Circulating micro-organisms have produced a passing irritation of fibrous tissue without lasting trace of their action, but the condition may be a forerunner of more serious attacks.

Periarthritis is a more severe form and the commonest of all the forms of chronic arthritis. The onset is generally acute. The patient wakes in the morning and finds some joints painful and stiff. Or it may

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for years, more and more of the joints becoming involved until a state of quiescence is reached in which the disease no longer progresses but the patient is left with joints irretrievably damaged, fixed, wasted and deformed. The disease usually begins in the proximal interphalangeal joints of the hands, and from the first its distribution is symmetrical. It then spreads to the metacarpo-phalangeal joints, wrists and ankles. Elbows, knees, hips and shoulders are affected to varying extents, and the cervical spine, sternoclavicular and temporo-maxillary joints are frequently involved. The swelling of the joints and the muscular wasting give a spindle-shaped appearance to the fingers. The skin over the joints is not hot nor flushed and there is no surrounding oedema. The swellings feel resistant and elastic with a fine crepitus. Associated with the pain is marked muscular spasm. The muscles shorten and contractures result. The hands show combined flexion of the proximal joints and hyperextension of the distal joints, with ulnar deviation, the wrists become fixed, and the knees and elbows are set in a flexed position. At a late period, when quiescence has been attained, exhaustion of the thyroid leads to hypothyroidism and the patient may become obese. The picture of a bedridden, exceedingly fat patient, with nearly every joint fixed and immobile, unable to stand, barely able to feed herself, resigned to her fate, and waited upon by a self-sacrificing family, is a very striking one which is not seen so frequently nowadays as formerly.

Osteoarthritis is found more in the elderly and especially in males. In females it occurs especially about the time of the climacteric. It attacks the larger joints such as the hip, knee, or spine, but there is a polyarthritic form which attacks symmetrically the small joints of the hands with the formation of osteophytes. But, unlike rheumatoid arthritis, it chooses the end joints

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e, unless the causal infection is very intense, when e absorption of bone is seen, and there is a normal e between the articular ends. In rheumatoid ritis there is increased translucency and thinning the bones with absorption of cartilage and conient disappearance of the space between the cular surfaces. In osteoarthritis the striking feaes are the bony outgrowths and the irregular icular surfaces.

TREATMENT.

This resolves itself into the treatment of the general alth, treatment of the infection and treatment of the ints. The ideal time to treat arthritis is before it gins. I have already suggested that we should pay ore attention to the premonitory symptoms—the isomotor instability, paræsthesiae and muscular cramps rheumatoid arthritis or the arthralgias and fleeting staks of fibrosis which precede fibroarthritis. Such mptoms should lead us to seek out the causes of l-health, the dietetic errors, metabolic deficiencies and ources of infection.

In fibroarthritis and osteoarthritis search must be ade for a focal infection, but with rheumatoid rthritis we seek some infected mucous membrane and generally the intestinal tract will be found at fault. In the two former a streptococcus is the usual causal organism, especially streptococcus viridans, but with rheumatoid arthritis *B. coli* is of equal importance. The streptococcus has been found in the mouth, throat, faeces, urine, joints and blood. Experiments on animals have suggested that streptococci have elective affinities and that streptococci isolated from the joints when injected into animals cause joint lesions whereas a streptococcus isolated from a gastric ulcer will give a gastric lesion in a majority of rabbits injected with it. But these experiments have not

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arise after a few days' indisposition or follow attacks of arthralgia. At first several joints may be attacked but later it settles in three or four. There is slight pyrexia, some enlargement of neighbouring lymph glands and a leucocytosis. The joints most often affected are in order of frequency the knee, elbow, wrist, ankle, shoulder and hip. They are moderately painful but have a feeling of tenseness rather than of acute pain. There is a variable amount of effusion and this, with the infiltration of the surrounding fibrous tissue and oedema, gives a swollen appearance to the joints. There may be effusion into tendon sheaths, and the capsule may become sclerosed, thickened and contracted. If it occurs in the fingers the appearance resembles that in rheumatoid arthritis, but the distribution is asymmetrical and the metacarpo-phalangeal joints are more often affected than the interphalangeal. The attack may clear up entirely, but if the cause remains fresh attacks occur and more joints are involved, but there is not the same remorseless spread to joint after joint as in rheumatoid arthritis. It is most common in those who do hard muscular work under unfavourable atmospheric conditions, especially in moisture-laden air with rapid changes of temperature, e.g. miners, farm labourers, gardeners, chauffeurs and coachmen. The actual joints involved are those subject to most strain, such as the spine in farm labourers, the wrists in motor-drivers, the knees in those who do much standing or walking. The disease should not be mistaken for rheumatoid arthritis as the lesions are asymmetrical and there is not the same profound disturbance of general health. Contractures, if they occur, are due to contraction of fibrous tissue and not to the shortening of muscles.

X-ray examination gives considerable help in the differential diagnosis of the forms of chronic arthritis. In fibroarthritis there is no change in the bone or car-

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been confirmed and, viewing the problem from the point of view of the host rather than of the germ, we find that of one hundred persons with an alveolar abscess, infected tonsils or other focal sepsis, the majority are free from any gross lesion although they may have slight general signs of ill-health, a few only have an arthritis, others some form of fibrosis, such as sciatica or a brachial neuritis, one or two perhaps a skin lesion or an iritis. It seems evident that various tissues may become sensitized to the same infection so that one person has hypersensitivity or allergy of the joints, another of the skin and another of the eye, or a heart valve. This sensitiveness may be due to previous slight infections and may be increased by strain or injury.

Among sources of focal infection we begin with the teeth, tonsils and nasal sinuses. With the teeth, apical infections and deep-seated pockets of pyorrhœa are the most important; the open sepsis of slight pyorrhœa is less serious unless there be hypochlorhydia when the swallowing of septic matter may eventually lead to gross infection of the small intestine. The extraction of teeth requires careful and anxious consideration in consultation with a skilled dentist. The wholesale extraction of teeth on the mere suspicion of pyorrhœa must be strongly condemned. In simple pyorrhœa much can be done by scaling, massage of the gums and strict cleanliness. Removal of tonsils may be required and small scarred tonsils are often more dangerous than hypertrophied ones. Enlarged tender glands beneath the angles of the jaw are good evidence of septic absorption and the urine may show streptococci of a type similar to those isolated from the mouth or throat. The antra and nasal sinuses and the nasopharynx require careful scrutiny. The alimentary tract must be examined for stasis, ulceration and catarrhal inflammations. The possibility of a chronic

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cholecystitis, appendicitis, salpingitis or prostatic abscess must be considered. Organisms from the alimentary canal may be obtained from the washed mucus from the stools or from the duodenum by a tube. Often the causal organism may be obtained most easily from the urine. A very thorough clinical and bacteriological examination has thus to be made in every case and the results assessed. Only in early cases with one or two accessible foci of infection will removal alone cause some improvement, but in later cases we may at least reduce the amount of subinfection.

Vaccine treatment is employed to raise the resistance of the patient to the infection, whatever its source. The vaccine should be made from young cultures and subjected to as little alteration as possible. As the patient is sensitized and reactions are easily produced the initial dose should be small and not exceed one million. Injections are made once a week, the dose being gradually increased. The dose which is just below that necessary to produce a reaction should be aimed at. Treatment must often be continued for a long period and large doses ultimately reached. Much vaccine treatment is ineffective because it is discontinued too soon.

In recent years the use of intravenous protein injections has added a definitely useful agent to our treatment of arthritis. The mechanism of action is still obscure but the injection is followed by an outpouring of non-specific antibodies from the cells, a leucopenia succeeded by a leucocytosis and an increase in the lymph flow. Any simple protein may be used. My own experience has been chiefly with typhoid-paratyphoid, or T.A.B. vaccine, which is a convenient standardized source of protein. Six intravenous injections are given at intervals of five days, a usual dose being 130, 160 and 200 million units. This is followed by a rigor and rise

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usually faddy about their food. All rheumatic patients receive strange advice from their friends, and sometimes from their doctors. They are told they must not eat meat because of uric acid, nor fruits because of acidity.

Local Treatment of the Joints.—During acute phases it is imperative that the joints should be kept at rest in a proper position. I lay great stress upon this as the majority of advanced cases I see have their joints fixed in bad positions and much crippling and suffering would be prevented by taking simple precautions in the early stages. Faulty positions are brought about by patients trying to assume the position of greatest ease, which is generally that of flexion. Pillows are placed beneath the knees and the bedclothes are allowed to press down upon the ankles so that the knees become fixed in flexion and the ankles in extension. The arm is carried in a sling and the wrist drops over to the ulnar side, and fixation of the hips in flexion results from propping the patient up in bed or in a chair. Adaptive shortening of flexors and stretching of extensors occur and the joints are ankylosed in unfortunate positions. Care should, therefore, be taken that the knees are extended—if necessary with the use of weights, the ankles kept at right angles, and the weight of the bedclothes kept off by a cradle, the wrists somewhat hyperextended, and the elbows at right angles. In applying weights for extension of the knees care must be taken that the articular surfaces are separated. The joints should not be firmly splinted, but held in position by sandbags or half a plaster cast so that slight active movements are possible. This helps to prevent wasting of muscles and the formation of strong adhesions. If the patient is unwilling to stay in bed for slow extension by weights he may be suitable for one of the excellent mechanical contrivances which cause traction and at

of temperature to 102° or 103° and then defervescence with marked sweating. As a rule the first injection is followed by a more prolonged reaction than the remaining ones. The doses are modified according to the intensity of the reaction. During the febrile stage there is increased pain and swelling of the joints, followed later by an improvement and the patient feels better. The best results are seen with fibroarthritis, in which a complete cure can often be obtained. With rheumatoid arthritis and osteoarthritis, from the nature of the joint lesions there is less scope for improvement.

Clothing.—Most patients are overclothed and wear layers of heavy woollen garments which keep the skin in an unhealthy, moist, unduly warm condition. Cotton mesh or silk next the skin is to be preferred.

Climate.—No climate will be found suitable so long as the infective causes remain. The desirability of a warm dry climate and of residence on a gravel or sandy soil has been exaggerated. I have seen patients become much worse during residence in Egypt and Algeria. Patients are often sent to certain neighbourhoods supposed to be beneficial, but one sees patients in whom the disease originated in these same places. Abundant sunshine is certainly important, and heliotherapy when properly conducted may be a great help in treatment. The ultra-violet lamp is an inferior substitute of service in this country, and too much must not be expected from its use.

Diet.—For all forms of arthritis sugars and soft starchy foods should be restricted. Rheumatoid patients require a gradual introduction to a generous diet with plenty of fats, milk, eggs, meat and fresh vegetables. Wholemeal flour should be used, not only for bread, but also for cakes and puddings. Stout osteoarthritics require a reducing diet with milder proteins and abundant vegetables. Hot water should be taken freely before meals. Arthritic patients are

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the same time take the weight of the body off the joints. These are especially useful in cases of osteoarthritis of the hip or knee, and quiescent cases of rheumatoid arthritis with contracture of the legs.

In the early stages some relief of pain will be brought about by rest and extension. Further relief can be obtained by the application of dry heat, preferably radiant heat. Excellent handlamps are made for this purpose. Hot sandbags provide a homely substitute. After the heat analgesic preparations, such as methyl salicylate or camphor and menthol, can be applied. The muscles may be gently massaged, but the joints must not be rubbed.

It may be that the best that can be done is to leave the patient with a quiet joint ankylosed in a good position, but more often the question arises, How long should the joint be kept at rest? No definite rule can be given, but when the temperature is normal and pain and swelling have subsided, changes in position can be made, followed by gentle passive movements. With further improvement active movements are commenced, and the patient must be encouraged to use his joints. At this stage much mental inertia has to be overcome, as patients get resigned to their fate and are unwilling to make the necessary efforts. Later on we have to deal with stiffness or contractures, and stimulating liniments of camphor and turpentine, iodine or mercury are indicated. This is also the time for hydrotherapy in its various forms, and the skilled bathing and massage to be obtained at spas will help to increase mobility. At home the patient must be trained to react favourably to cold baths of graduated temperatures and radiant heat should be continued. Ionization may be of use by warming the tissues and stimulating metabolism and lymph flow, and diathermy is still better in careful hands.

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Patients with partially or completely ankylosed joints may need manipulation under anaesthesia, but this requires extreme care and should not be attempted so long as there are any signs of activity. There is grave risk of fracturing bones and of rupturing blood-vessels and nerves. When the joint is reduced ankylosis is again allowed in the best position if a mobile joint cannot be obtained. In a few cases arthroplasty may be possible, especially in cases of ankylosis of the jaw, fixation of the elbow in extension, and ankylosis of several joints in the same limb. Complete bony ankylosis gives better results than painful fibroid ankylosis, and young adults are the best subjects for the operation.

Drug Treatment.—This I have left to the last. No drug has a specific action in these cases. Guaiacol carbonate, guaiacum, sulphur, collosol sulphur, and collosol iodine have all been advocated, but I have not seen any special effect from their use. Drug treatment must mainly be symptomatic. In rheumatoid arthritis, if hypochlorhydia has been found, large doses of hydrochloric acid should be given with meals. Liquid paraffin, kaolin, and dimol may be required for intestinal stasis, together with a proper fitting abdominal support. Thyroid is of great value in advanced rheumatoid arthritis and in climacteric arthritis. In acute fibroarthritis potassium citrate and other saline diuretics should be given. Acetosalicylic acid is useful for the relief of pain, but is apt to be abused.

The future of these patients is not so hopeless as was once thought. In most cases some improvement can be brought about and sometimes the results are brilliant, patients who have long been confined to bed being able to walk again and lead useful lives. No disease requires more patience and perseverance on the part of both patient and doctor, and cheery encouragement and confidence will do much to lighten the task.

The Significance of Pain in the Lower Extremities and its Treatment.

By WILFRED HARRIS, M.D., F.R.C.P.

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PAIN, if persistent or repeated, is a symptom that we cannot afford to disregard. It is so easy lightly to dismiss such a complaint as "rheumatic," or even as functional or hysterical. In the case of females, and especially if the patient's manner is suggestive of nervousness, the latter diagnosis is only too frequently made through carelessness in not making a proper examination or in forgetting that nervousness of manner does not exclude the presence of an organic lesion. Psychalgia, pain of mental origin or pain that grossly exaggerates a slight organic cause, is probably as frequently met with in males as in the opposite sex.

Herpes zoster.—Sometimes even the wariest of us may be trapped by the pain of herpes zoster when one of the lower lumbar roots is affected. The complaint of pain will then be referred to the loin and hip, and perhaps down the thigh, sharp enough to keep the patient awake at night, but with no objective physical sign even on the most careful examination, as in some cases the appearance of the characteristic rash is delayed for several days. Very likely, and quite justifiably, one orders an anodyne liniment, such as belladonna and opium, and presently the herptic rash develops, which the patient promptly ascribes to the liniment ordered, and calls in another doctor. If he, in

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his turn, is careful in his examination, the case now presents no difficulty, but it may be hard for him to persuade the patient that no blame at all is attributable to the treatment, even if he tries. Herpes zoster may be the signal of irritation of a posterior root by caries of the spine, or of a spinal tumour, but more commonly it is the result of some infective process in a posterior root ganglion. In persons under the age of fifty the herpetic pains usually disappear within a fortnight, though with increasing age there is an ever greater tendency for a persistent post-herpetic neuralgia to develop in the area of the scarring of the herpes, sometimes most exhausting in its intensity. True zoster, or zona, so-called because of its frequency along an intercostal nerve distribution, always leaves permanent scarring, though it may affect any sensory nerve from the fifth cranial to the lowest sacral. It is almost invariably non-recurrent, though it should be remembered that there are recurrent forms of so-called herpes. One of these is especially liable to affect the loin and buttock region, causing pain of a mild zoster character, though leaving practically no permanent scarring. Herpes genitalis, and herpes febrilis on the lips and cheek, also may be recurrent, but leave no scarring and are a totally different disease from true zoster. Many points in the patient's description of the symptoms will be of assistance in diagnosis: the character of the pain, its mode of onset (whether sudden or gradual), its situation (whether in one limb or both), and whether paroxysmal or constant.

Tabes.—The lightning, shooting pains of tabes are not easily simulated by any other condition, the two most frequent errors being to mistake them for the pains of chronic rheumatism, or for the pains of multiple neuritis due to diabetes or to chronic alcoholism. Cachets of various combinations of phenazone, pyramidon, phenacetin or acetanilide, with a half grain of

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quinine, a sixth of codeine, and five grains of aspirin may keep the tabetic pains sufficiently under control. It should be remembered that aspirin does not go well in a cachet with phenazone or pyramidon, in a day or two producing a sticky wet mass, but should be given separately in tablet form, or the whole may be given in fluid form. Intravenous injections of NAB or other arsenobenzol preparations sometimes bring great relief, but in the most severe cases of crises of tabetic lightning pains a more drastic treatment is advisable of intraspinal injections of autoserum, following intravenous salvarsan. For this I use two injections of 0·6 grammes kharsivan, the English equivalent of true salvarsan, given intravenously at a fortnight's interval, and immediately after the second injection five ounces of blood are withdrawn from the vein by a larger needle, from which 50 c.cm. of serum are prepared and injected intraspinally twenty-four hours later. The pain of osteoarthritis of the hip joint is frequently mistaken for sciatica, but the pain in arthritis does not shoot down the back of the thigh to the heel or ankle, but usually is referred from the back of the hip into the groin and down the thigh into the knee—rarely below. I have once known the pain in well-marked osteoarthritis of the hip to be complained of only below the knee, along the outside of the leg, and was ascribed to the wearing of a tight pair of garters. Careful examination of the movements of the hip joint will usually disclose limitation of movement of rotation or of abduction, with pain caused by forcing the movement. Occasionally in early arthritis of the hip no limitation of movement may be discernible, and the diagnosis of arthritis may only be proved after a good X-ray photograph. Stereoscopic pictures are by far the best, but to appreciate their value the two pictures or, better still, the two negatives, must be examined together in a good stereoscope, which gener-

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ally necessitates going to see them at the radiographer's house. Arthritis of the hip joint is not infrequently accompanied by true sciatica, which is scarcely to be wondered at when one remembers how close the nerve runs behind the hip joint. Both conditions will then require treatment, though chronic hip joint disease is less promising in its results than ordinary sciatica. Hot brine baths, volcanic mud packs and other forms of spa treatment may bring relief from the pain, but some lameness will remain permanently.

Sciatica, or sciatic perineuritis.—This is commonly a sequel of a rheumatic fibrositis affecting the lumbar muscles and lumbo-sacral fascia, spreading to involve the sciatic sheath at the notch where the nerve issues from the pelvis. Not only at this point, but for another four inches lower, as far as the lower border of the tuber ischii, the sciatic sheath may commonly be involved in this form of subacute inflammation, often resulting in adhesions. Such inflammation of the sheath at once causes pain, spreading down from the back of the hip down the back of the thigh to the calf, ankle and heel, with probably local tenderness on pressure over the nerve in the buttock, and pain on extension of the nerve by raising the heel with the knee kept straight, the so-called Leri's sign. Diminution or loss of the Achilles jerk may soon follow, evidence of the spread of the perineuritic inflammation within the nerve bundles, and later even numbness of the outer border of the foot, and even blueness and a sensation of coldness of the foot. Weakness of the calf muscles or dorsiflexors of the ankle and toes is rare in ordinary sciatica, though it may occur in diabetic neuritis of the sciatic or other gross forms of lesion of the nerve, such as malignant growths in the pelvis or caries of the sacrum or lumbar vertebræ. Adhesions to the sheath of the nerve in the neighbourhood of the notch may cause definite scoliosis, the body being drawn down

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quinine, a sixth of codeine, and five grains of aspirin may keep the tabetic pains sufficiently under control. It should be remembered that aspirin does not go well in a cachet with phenazone or pyramidon, in a day or two producing a sticky wet mass, but should be given separately in tablet form, or the whole may be given in fluid form. Intravenous injections of NAB or other arsenobenzol preparations sometimes bring great relief, but in the most severe cases of crises of tabetic lightning pains a more drastic treatment is advisable of intraspinal injections of autoserum, following intravenous salvarsan. For this I use two injections of 0·6 grammes kharsivan, the English equivalent of true salvarsan, given intravenously at a fortnight's interval, and immediately after the second injection five ounces of blood are withdrawn from the vein by a larger needle, from which 50 c.cm. of serum are prepared and injected intraspinally twenty-four hours later. The pain of osteoarthritis of the hip joint is frequently mistaken for sciatica, but the pain in arthritis does not shoot down the back of the thigh to the heel or ankle, but usually is referred from the back of the hip into the groin and down the thigh into the knee—rarely below. I have once known the pain in well-marked osteoarthritis of the hip to be complained of only below the knee, along the outside of the leg, and was ascribed to the wearing of a tight pair of garters. Careful examination of the movements of the hip joint will usually disclose limitation of movement of rotation or of abduction, with pain caused by forcing the movement. Occasionally in early arthritis of the hip no limitation of movement may be discernible, and the diagnosis of arthritis may only be proved after a good X-ray photograph. Stereoscopic pictures are by far the best, but to appreciate their value the two pictures or, better still, the two negatives, must be examined together in a good stereoscope, which gener-

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nerve bundles and breaks down adhesions. A second injection five or six days later is sometimes necessary to complete the cure. In certain cases the sciatica is due to inflammatory exudation around the nerve trunks higher up, in the neighbourhood of the intervertebral foramina, resulting in a curious deformity, a contra-lateral scoliosis, in which the body is flexed laterally away from the painful leg. This is doubtless a reflex protective measure to avoid pressure upon the affected nerve roots, for forcible flexion of the spine to correct the scoliosis usually causes pain to shoot down the leg. This is a much more difficult type of sciatica to treat, and usually requires two to three months' rest in bed. Sometimes paravertebral injections to the fourth and fifth intervertebral foramina of novocain and saline may relieve, or injections of the same solution into the sacral canal through the sacral hiatus between the lower end of the sacrum and the coccyx. Injections of novocain and saline intraneurally should never be used in the acute stage of sciatica. Rest then is essential, and it may be necessary to give analgesic drugs, such as cachets of pyramidon and heroin, with aspirin, or even injections of morphia to procure rest at night. When in such acute pain, relief may be quickly, though temporarily, obtained by large subcutaneous injections of oxygen. A sterile injection needle with a circular mount should be fitted to a sterile rubber tube and attached to the nozzle of an oxygen cylinder. The oxygen must first be turned on gently and the needle point held under the surface of some sterile water, so that the oxygen bubbles are seen to be running fairly rapidly. The needle is then inserted well under the skin in three or four places along the course of the nerve as previously drawn, and enough gas run in to produce considerable surgical emphysema of the buttock. Never insert the needle before turning on the gas from the cylinder, owing to

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towards the same side, with a tendency to walk with the knee bent and the heel not touching the ground properly. This form of contracture may persist for two or three years, or longer, and requires some form of surgical treatment. Mere rest in bed will not now avail, neither will massage nor electrical treatments be of any use. Stretching the nerve by passive flexion of the hip with the knee kept straight under a general anaesthetic, followed by Swedish remedial exercises, is sometimes of service, but this treatment often fails for the reason that the adhesions require lateral rupture and not longitudinal stretching. The nerve may be cut down upon in the buttock, and scarified, but usually as good or better results may be obtained by one or two injections of sterile warm normal saline into the nerve at the notch, and perhaps at the level of the tuber ischii. The outline of the course of the nerve should be drawn on the skin with a dermatograph pencil, the notch being about four inches external to the top of the intergluteal cleft, and four inches vertically above the tuber ischii, while the nerve bends outwards and downwards to run between the tuber ischii and the lesser trochanter. A four-inch needle, or sometimes a five-inch, is necessary, of one millimetre calibre, fitted with stilet, and a 10 c.cm. Record syringe. No general anaesthetic should be given, but sterile 2 per cent. novocain solution may be freely used. The nerve when struck gives rise to a sensation of electric thrilling down the leg to the ankle or toes, the needle is held steady and little saline injected quickly. If this repeats the sensation down to the foot, then the point of the needle is still within the nerve and has not passed through it. Two c.cm. of the novocain solution is then injected, and within half a minute 60 to 80 c.cm. of saline may be slowly injected without causing any pain. The sciatic nerve in this region is a loosely-built nerve and swells up with the saline, which infiltrates between the

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sign of bone erosion.

Anterior crural neuritis.—This is comparatively rare, but is usually mistaken for sciatica. The distribution of the pain is more over the front of the thigh to the knee, though it resembles sciatica in usually commencing around the back of the hip. The pain is apt to be paroxysmal, and may be intensely severe, probably more so than is usual in sciatica. The knee-jerk may be diminished or lost, just as in a proportion of cases of sciatica the ankle-jerk is lost. Wasting of the quadriceps is met with only in chronic cases, as in diabetic neuritis, and in gross lesions of the nerve as when damaged by pelvic growths. Acute anterior crural neuritis may be the result of septic absorption, chill, gout, or it may be part of the picture of a multiple neuritis, as in diabetes or alcoholism. The treatment of this form of neuritis will be on general lines by anodyne liniments, fomentations or anti-phlogistine packs, rest in bed, and internally salicylates or aspirin, with combinations of pyramidon or phenazone with codein or heroin and medinal. Cachets of pyramidon, heroin and medinal may be used to relieve the pain at night and to induce sleep, and in the most severe cases injections of morphia or of heroin may be necessary.

Disease of the spinal cord.—Disease of the spinal cord or of its roots in the lumbosacral region, causing pain in the lower extremities, will usually affect both limbs, so that even if the pain be limited to one side there will be physical signs to be detected in the other also. It is therefore important always to make a routine examination of the knee and Achilles jerks and of the plantar reflexes, and of the sensation of the feet and legs to touch and to pin-prick. More elaborate sensory tests are available in cases of doubt, but if the above tests are carefully examined there will be comparatively few mistakes

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the difficulty of controlling the rush of gas. Most of the emphysema will have disappeared by the following day, and the pain may return. It is difficult to explain the mechanism of the relief of pain by this means. Ionization with the constant current, using large electrodes thickly padded, and a strong current up to 40 or 50 milliamperes or even more, sometimes gives great relief, but it needs expert administration, as it is easy to cause electrolysis of the skin by this means, and these electric burns are very slow to heal. The actual chemical solution used on the electrodes does not, I believe, matter much. Salicylate of soda or iodide of potash solution may be used on the negative electrode, but the amount of salicyl or iodine ions that are driven through the skin must be infinitesimal in weight, and even then are probably caught up by the blood-stream or lymph without actually reaching the inflamed sheath of the nerve. An obstinate sciatica may after many weeks' treatment turn out to be due to tuberculous caries of the sacrum or lower lumbar vertebrae, and a swelling due to a cold abscess appearing at the top of the buttock may be the first indication that bone disease and not rheumatic perineuritis is the source of the trouble. An even commoner cause of obstinate sciatica is malignant disease in the pelvis or lumbar vertebrae, often secondary to carcinoma elsewhere. A very common history is a primary breast amputation for carcinoma from a few months to two years previously, followed later by pains in the back radiating down one leg, often worse at night, and not made worse by stretching the nerve. The Achilles jerk may not be lost, and there may be no sign of any nerve damage, such as anaesthesia or muscular wasting, but the progressive emaciation will be a clue to the correct diagnosis, in addition to the history of operation for tumour, even though X-rays may not be able to demonstrate any

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made. The presence of an extensor plantar or Babinski reflex on one or both sides will be definite evidence of interference with the pyramidal tracts above the sacral level, suggestive of spinal cord lesions such as disseminated sclerosis, or of an intra- or extra-medullary tumour. Sometimes a clue to the diagnosis of obscure pains in the limbs, or even of a developing paraplegia, will be the presence of scattered fibrous subcutaneous nodules or tumours in various parts of the body, which the patient will acknowledge to have been present for very many years. They are usually rather tender on pressure, and are really *neurofibromata*, the disease being known as neurofibromatosis, or von Recklinghausen's disease. These fibrous tumours are found involving nerve fibres, or may be found on the spinal roots within the spinal canal, and may thus set up a gradual pressure paraplegia.

Dercum's disease, or *Adiposis dolorosa*.—This is another condition often overlooked, in which chronic pains in the limbs are associated with an excess of subcutaneous fat. Treatment by the administration of thyroid extract sometimes is of benefit here.

Phlebitis.—This is an important cause of pain in one calf or thigh, usually in persons in later middle life, that is usually easy to recognize by the local tenderness and by the tortuous hard clotted veins. The limb will be distinctly swollen, and there may be slight pitting about the ankle on pressure. Rest is essential, on account of the danger of the dislocation of a clot and thus setting up pulmonary embolism. Belladonna liniments and poppy fomentations, with citric acid internally will ease the pain and arrest the tendency to spreading of the venous thrombosis. Progressive attacks, however, are apt to ascend the limb from the calf until the femoral vein itself is involved, or even the vena cava itself, causing oedema of both legs.

I was once asked by a young surgeon to see a

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woman who had had some pelvic injury, because, he told me, the left limb was wasting. When I came to examine the legs, it was quite true that the left limb was considerably smaller than the right, not, however, because it was wasting, but because there was obviously thrombosis of the right femoral vein.

Chronic vascular disease.—This, in the form of Raynaud's disease, endarteritis obliterans or chronic thrombo-angeitis, may be a source of gradually increasing lancinating pains in both legs easily mistaken by a practitioner for neuritis. Inspection of the feet and legs will at once reveal the cyanosis indicative of Raynaud's disease, while the more serious condition of thrombo-angeitis will be recognized by the puffiness and blotchy discoloration, in addition to the loss of pulsation in the dorsalis pedis or posterior tibial arteries in one or both feet. Gangrene is much more severe and extensive in the latter form than in Raynaud's disease, in which the loss of tissue is usually limited to small patches near the ends of the toes. Glycosuria is a not uncommon factor in the development of arteriosclerotic gangrene, which is also seen frequently in cases of excessive tobacco smoking, especially in the Hebrew race. Chronic thrombo-angeitis may in suitable cases, in the absence of glycosuria, and in subjects under the age of fifty-five, be successfully treated by the operation devised by Leriche, periarterial sympathectomy. The sympathetic nerve plexus surrounding the main artery to the limb, the femoral, is carefully dissected away from the vessel and removed over a distance of two to three inches. By this means the vaso-constrictor fibres are destroyed, while the vaso-dilators which run with the muscular nerves are now unantagonized, with consequent vaso-dilatation and flushing of the limb..

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direction; the sternocostal part pulls the abdominal viscera forwards and downwards, thereby increasing the back to front diameter in the lower part of the thorax. Duchenne showed that if the descent of the abdominal viscera is restrained, the diaphragm spent its force in elevating the thorax. The action of the diaphragm depends on which group of muscles comes into play as its antagonists. If the abdominal contents are rendered fixed by the abdominal musculature, the lower margin of the thorax moves towards the domes of the diaphragm. If, on the other hand, the ribs are fixed by the intercostal muscles, the domes of the diaphragm move towards the lower aperture of the thorax. In other words, if the abdominal muscles are rigid the diaphragm will go up in inspiration with the rest of the thorax. On the other hand, if the abdominal muscles are slack, the diaphragm will descend with inspiration.

The importance of the abdominal muscles will be appreciated when we bear in mind the condition of the abdomen in cases of basal pneumonia or pleurisy. The difficulty of distinguishing between an acute abdomen and a basal pleuro-pneumonia is known to all, and no matter how careful we are in our observations, it happens that we have sometimes to advise exploration so as to be on the safe side. The difficulty is due to the board-like hardening of the contracted abdominal muscles. This is a point to which reference will be made later, for it has an important bearing on the events occurring when the pleural inflammation goes on to the formation of fluid.

If we take the usual physical signs of pleural effusion, viz. displacement of organs, usually the heart, diminished expansion, absent tactile vocal fremitus, dull percussion note, diminished or absent breath sounds and vocal resonance, and possibly ægophony, there is really not one of them that is entirely peculiar to a

Observations on the Diaphragm and Pleural Effusions.

By CHARLES MILLER, C.B.E., M.D., F.R.C.P.

Consulting Physician to the London Hospital; Assistant Physician to the Royal Devon and Exeter Hospital, etc.

IT is astonishing how little is taught to students about the diaphragm, though the diaphragm is the most important muscle of respiration. Litten's sign is the only one that I heard about in my student days. This depends on the fact that in the expiratory position of the chest the lateral part of the diaphragm is in contact with the chest wall. During inspiration the diaphragm leaves the chest wall, and the lung expands to fill the space. But the lung does not fill the space as quickly as it is made, and the intercostal spaces fall in. To make this observation you must have the right patient. He must be able to breathe slowly and evenly; he must be able to hold his breath when required, and he must be thin. You must have him well exposed. You must stand a few spaces from the foot of the bed, and the only light of the room should be from a window behind you. This is obviously much more an examiner's than a physician's sign. Much of our understanding of the diaphragm is due to the teaching of Keith.¹ He has shown that the movement of the diaphragm is that of a piston, and that the movement of the diaphragm as a whole is forward as well as downward.

There are two separate parts of the diaphragm: (1) the spinal or crural; (2) the sternocostal. The spinal segment tends to elongate the thorax in a vertical

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you suspect fluid, and the physical signs do not yield the full evidence, use the needle, for you will do more harm by neglecting an empyema than by needling solid lung. But I am sure that I am not alone in having satisfied myself from the physical signs that the patient had a pleural effusion, and in having failed to find fluid with a needle. I have even gone so far as to resect a rib when needling has failed.

It was not until the war that I began really to trouble myself about the why and wherefore of abortive needlings. Chest wounds gave unique opportunities for observations on a certain type of effusion, and there was much to learn from a hæmorthorax. If a man had a bullet wound of the chest, spat blood, and had signs of fluid on the wounded side, it could be argued that he had a hæmorthorax. Very often no fluid was withdrawn on exploring the dull area. This was especially true during the first few days after the wound. Later, it was more easy to find. Of course theories abounded to explain these happenings. "The blood had clotted, and the clot had not shrunk enough for fluid to be found," so said one authority. Some enthusiasts even injected proteolytic enzymes into the pleural cavity with the object of digesting the clot. As is usual when an explanation is wanted, post-mortem examinations revealed the true state of things. In gun-shot wounds of the chest it was the rule to find the diaphragm very much raised. There would be fine loose fibrinous pleural adhesions between the diaphragm and thoracic wall and the lung. Such blood as there was present was fluid, and apparently the respiratory movements had prevented the formation of dense clot. Needling, in these cases, had been too low.

The infected cases gave very interesting evidence. There would be an empyema cavity resting on the dome of a raised diaphragm. Its lining would be purulent lymph. On separating the raised diaphragm

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pleural effusion. Perhaps displacement of the heart and absence of tactile vocal fremitus are the most trustworthy of these signs. Sometimes the character of the percussion note is such that one says "nothing but fluid can produce so flat a note." On the other hand, I have often found fluid when there was hardly any appreciable dullness, and the flattest of notes can be produced by solid lung. Tactile vocal fremitus also can be absent over solid lung as in the small airless wet lung of pulmonary influenza, and in pneumonia when the tubes are blocked.

But even the displacement of the heart is not an absolutely trustworthy sign. It can happen that a lung is so increased in size by pneumonic consolidation, that the heart is displaced by it. In massive one-sided lower lobe collapse the same phenomenon can occur, but here there are other factors at work, such as the raised diaphragm. To give an example of the fallibility of the best signs I will quote a case seen in France during the war :—

A German prisoner was shot by a bullet—entrance through the manubrium sterni and exit through the left scapula. There was much superficial bruising and surgical emphysema. He was spitting blood. There was dullness in the left axilla and back, and the heart was well to the right of the sternum. Post-mortem, there were dense fibrous pleural adhesions on the left side; the left lung was large and stuffed with blood; it weighed $2\frac{3}{4}$ lbs., whereas the right lung weighed exactly 1 lb. less.

Of course, these circumstances are special and not likely to occur in civil life, but the case illustrates the uncertainty of the best of physical signs, and the impossibility of regarding any one sign as pathognomonic of fluid.

As in all morbid states diagnosis depends on an appreciation of altered function, altered structure, and an understanding of pathological processes, and not on any one physical sign or group of signs. But given certain physical signs in a chest it is justifiable to use an exploring needle. I would go farther. If

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murmur replace the bronchial breathing of the collapsed lung, as the diaphragm took a lower level, and to find that the splaying of the costal border passed away.

Observations such as these may not appeal as having any bearing on pleural effusions that are seen in civil life, for the absence of trauma alters the whole picture. But since the war I have measured a great many chests with a double tape-measure so as to compare the semi-circumference of the two sides. In cases of pleural effusion I have been struck by the fact that the side of the effusion was frequently smaller than the sound side. But textbook authorities have different views, e.g. "There is alteration in the shape of the chest and increase in the semi-circumference." And again, "In the majority of cases the area of the chest is enlarged, the unaffected side being also increased, but to a lesser degree." And still again, "In large effusions there is increase in size of the affected side."

Gee, however, has something more interesting to say: "The causes of unilateral enlargement are increase in the size of the lung, or effusion of fluid into the pleura. When the effusion is partial, it does not shift easily, or at all, with changes in position of the body. The semi-circumference is sometimes actually less on the diseased than on the healthy side." This is certainly a personal observation of Gee's as a result of careful and methodical examination. My own observations are in agreement with his, but I go farther and say that I have found in civil life that more than half of pleural effusions seen are associated with a smaller semi-circumference.

C. F. Hoover in America has made some very valuable observations on the costal margin and the subcostal angle. He has shown that the only agent which causes widening of the subcostal angle in inspiration is the intercostal musculature.²

In paralysis of the entire diaphragm there are

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from the thoracic wall, the pleural surfaces where separated would be found to be clean and with friable fibrinous adhesions holding the diaphragm and chest wall lightly together. These post-mortem observations were very valuable at the time, and are of importance now, for many men who are short of breath following chest wounds suffer because the diaphragm is fixed in the high position.

When a man is hit in the chest or abdomen, especially if he is hit in front, and between the levels of the nipples and umbilicus, he takes a big inspiratory gasp. During this act the abdominal muscles are violently contracted, and the diaphragm is suddenly raised. Wounded men would say that at first they could not get their breath. Their state was very similar to that of the football player who is winded. The diaphragm goes up and will not come down. It goes up on both sides, and on the sound side it comes down after some days. On the side of the hæemothorax it sticks. I have frequently seen the pulsation of the heart in the second and third left interspaces soon after the wound. In some cases it apparently reached a higher level on the sound side than on the other. It undoubtedly took a great part in producing the much-discussed phenomenon, "contra-lateral collapse."

Having obtained post-mortem evidence it was necessary to notice any physical signs. First, it was easily seen that the subcostal angle was widened, and the costal margin splayed out. Next, measurement of the semi-circumference on the two sides at the level of the sixth interspace revealed the fact that the sound side was bigger than the other, in spite of the presence of a hæemothorax. This was not invariably the case, and undoubtedly changes rapidly took place on the sound side both as regards semi-circumference and its half of the subcostal angle. In the cases that remained under observation it was common to find the vesicular

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removed. A week afterwards he developed signs of a right-sided pleural effusion. He was needled several times as an empyema was suspected. As this failed I was asked to see him. The man's appearance suggested pus. I measured the chest at the level of the sixth space and found that the right side was more than an inch bigger than the left. I argued that the diaphragm was raised, and that previous needlings were too low. I needled in the sixth space between the scapula and spine, and found pus.

This was probably a case of diaphragmatic pleurisy causing rigidity and contraction of the abdominal muscles, simulating or accompanying an acute abdomen. The diaphragm was not allowed to descend, so inspiration took it upwards. Fluid formed, and was above the level of the raised diaphragm.

The behaviour of the diaphragm in pleural effusions and in many other morbid conditions, e.g., basal "pneumonia" after abdominal operations, is obviously of importance. The difficulty is to appreciate what it is doing. Litten's sign is of no value in such circumstances. But we have several observations that we can make. If the subcostal angle is narrowed, either all or half of it, in inspiration, it means that the diaphragm is master—that is, it is flat and can pull. If the costal margin is splayed out, on one or both sides, it means that the intercostals are master and the diaphragm is curved. Simplest of all to observe is the measurement of the semi-circumference. If it is increased the diaphragm is high; if it is diminished the diaphragm is low. When the diaphragm is low and fluid is present, it is difficult to miss it with a needle. When the diaphragm is shown to be high by the increased semi-circumference, it is advisable to go high with the needle.

References.

¹ Keith, A., "Further Advances in Physiology," edited by Leonard Hill.

² Hoover, C. F., *Archives of Int. Medicine*, vol. 30, No. 1, 1922.

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exaggerated outward movements of both costal margins. In lesions of the cord in the upper thoracic region below the origin of the phrenic nerve, we find that in the middle phase of inspiration the subcostal is narrowed, and the costal margins move towards the middle line. We see the same thing when the dome of the diaphragm is flattened, as in spasmodic asthma and in emphysema. If there is a flat diaphragm, the diaphragm has the mastery of the intercostal muscles, and the costal margin moves towards the middle line, and the subcostal angle is narrowed. But if there is much of a curve, either convex or concave, of the diaphragm, the intercostal musculature has the mastery, and the costal margin is splayed out and the subcostal angle widened. It does not often happen that the diaphragm is convex downwards. I have seen a child whose spleen was palpable low down in the abdomen in whom there was a large left-sided pleural effusion. But such cases are rare.

On the other hand, a moderate descent and a flattening are common; and in certain circumstances a raising of the diaphragm with its convexity upwards occurs fairly often. When the diaphragm is lowered and flattened, the semi-circumference of the chest is lessened. This is what happens in a great many pleural effusions: the lateral portion of the diaphragm leaves the chest wall. A space is formed which contains fluid, and the results of needling are satisfactory. But in some cases the semi-circumference is increased. In these the diaphragm is raised; the lateral part of the diaphragm is in contact with the chest wall and there is a good chance of the needle being put in below the level of the fluid. This was certainly the case in the dry needlings in the war. But it can happen in civilian life also, as the following case will show:—

A man was admitted into hospital with what appeared to be an acute abdomen. It was decided to operate, and the appendix was

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The General Practitioner's Part in the Public Health Services.

By OSCAR M. HOLDEN, M.D., D.P.H.

Medical Officer of Health, Blackburn.

THE first report of the Consultative Council of Medical and Allied Services brought into special prominence the relations of general medical practitioners with public health activities. Both private practice and public health have their peculiar difficulties, so that close co-operation, unity and concord are a necessity between the two. Public expressions of the alleged superiority in intellect and moral sense of any one section of the profession over another are not true, and in addition are damaging to the prestige of the profession, and inimical to the spirit of team work which should permeate all sections of medical action and thought. Owing to the training of medical students, the finished product of the medical schools is apt to believe that "Man is born to trouble as the sparks fly upwards," rather than "Prevention is better than cure." The student sees much of disease and little of the predisposing causes of disease, so that he comes to regard sickness as an established thing in the universe, forgetting the fact that amongst wild animal life there is hardly any disease.

Preventive medicine is young, and so far there has been nothing more done than a mere clearing of the ground, but even these preliminary efforts are showing results in the reduction of morbidity and mortality rates, in the diminishing incidence of some diseases, and the virtual elimination of others. Every medical

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man who accepts service under the National Health Insurance Acts gives an undertaking to carry out preventive as well as clinical duties. The full value of medical treatment cannot be obtained unless the practitioner, whilst being an agent for the treatment of obvious disease, also recognizes and handles it in its earliest stages; and is a missionary, in the homes which he visits, of the value of personal hygiene. This view is the underlying thought of the interim report of the Consultative Council. As Sir George Newman remarks in one of his annual reports : "Those who undertake insurance work form a definite part of the great national organization for the control of disease and the prevention of premature death." In all the annual reports of the Chief Medical Officer of the Ministry of Health a considerable section is devoted to the work of the general practitioner services.

The Public Health Service to be of value must comply with three requirements :—

- (1) Do work required by the public.
- (2) This work must be of general use.
- (3) It must be of such a nature that it could not be carried out in another manner.

In recent years there has been a remarkable extension in the provision of public health services. Since 1911 upwards of 400 enactments, regulations, orders and circulars have emanated from Whitehall relating to this aspect of sociology. Legislation follows public opinion, so it is reasonable to suppose that the service is fulfilling the three requirements laid down above.

The Ministry of Health originally organized its medical activities under six main headings :—

- (1) General Health, Epidemiology and Administration.
- (2) Maternity and Child Welfare.
- (3) Tuberculosis and Venereal Diseases.
- (4) Food Supplies.

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so. Prevention of spread is not of great concern in this disease, but adequate nursing is of paramount importance. The object is that all cases of pneumonia notified should be visited, and nursing assistance, for which the local authority makes provision, be offered. In particular it is the poorer classes of the community for whom this measure is especially designed. By notification also, insanitary housing defects, over-crowding, and other deleterious home influences are brought to the notice of the authority, which has a certain amount of power to remedy such defects, slow and cumbrous though the procedure may sometimes appear.

I am afraid that some practitioners are apt to place too implicit a faith in the value of bacteriological reports. I refer especially to the swab reports in cases of diphtheria. Any bacteriologist of repute will say that a negative swab conveys nothing at all; it is the positive swab that counts. A mistake is occasionally made by delaying the administration of antitoxin until a positive swab result is obtained. This is a dangerous policy, and to guard against it most local authorities supply free of cost to any medical practitioner demanding it, such diphtheria antitoxin as he may need. The Schick test also affords opportunities for useful work in prevention. I am aware of the common people's distrust of hypodermic needles, but this distrust can be attributed to unfamiliarity and ignorance. The Schick test has received the benediction of the Ministry of Health and, consequently, must be of value in the ascertainment of diphtheria susceptibles. The Schick test is not an immunizing procedure, and for the most useful results it is necessary to go on with immunization in all Schick positive cases. This procedure is becoming simplified and should soon be easily applicable in private practice.

(2) *Maternity and Child Welfare.*—In this branch of

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- (5) General Practitioner Services.
- (6) International Health.

Two other great divisions must be added to the above to complete the whole. Although these divisions are under different Government departments, their functions are so closely allied that it is bordering upon the anomalous for them to be separated. I allude to : (1) The School Medical Service—Board of Education, and (2) Industrial Medicine and Hygiene—Home Office. I do not touch upon the Poor Law, though this is another anomaly. The general practitioner can help his local authority and it can help him in various ways, a few of which I have endeavoured to illustrate in the following paragraphs.

(1) *Epidemiology and General Health.*—The general medical practitioner has not, I venture to submit, realized to the fullest extent the potent influence he can exert in the prevention of epidemic disease. This influence is peculiar as he is, in many ways, the recognized general adviser to the family; consequently his assistance in enforcing isolation and in backing up official recommendations is very powerful. Although it is possible to enforce certain measures by law, yet one naturally hesitates to use this power except under extreme compulsion. In a recent epidemic of measles, in Blackburn, out of 1,049 cases 90 per cent. were attended by doctors, and in 35 per cent. of these there was no attempt at isolation. In the remaining 10 per cent. no doctor attended, and of these 46 per cent. were not isolated. The principle of the notification of infectious disease is sometimes misunderstood. The object of notification is primarily information. Having obtained the information a local authority is able to apply such measures for prevention, or nursing, as it has seen fit to provide. Influenza and primary pneumonia are notifiable; the former is undoubtedly contagious, the latter has not yet been proved to be

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public work the general practitioner can do much to help. In the earlier days I had men come to me and say that the clinic was stealing all their practice amongst babies and infants. I replied I was not particularly sorry to hear them say so because, as the clinics only gave advice and helped in providing adequate nourishment, it was proof that they were functioning well. If treatment is needed the practitioner is called upon. We ask, in return, that the doctors refer to us cases whom they think would benefit by attendance at a clinic. It is regrettable that the subject of infant welfare should have given rise to controversy. If fewer babies now attend practitioners' surgeries it is an indication of the progress for which the whole profession expresses a desire.

The Medico-Sociological Committee of the British Medical Association, in their report on the Value of Maternity and Child Welfare Work in Relation to the Reduction of Infantile Mortality, express the opinion that the action of the Ministry of Health, to secure provision of sufficient and suitable midwives, deserved the active support of the medical profession. In these days the "handy woman" is an anachronism, but, alas! she depends for her existence upon the medical profession. Progress towards a more efficient maternity service will be faster the greater the co-operation between all parties concerned. The handy woman is responsible to herself alone; the qualified midwife is under supervision. Doctors' fees, when called in in an emergency to a case attended by a qualified midwife, are payable by the local authority according to the scale laid down by the Ministry of Health. May I remark here, as an outcome of my experience in various towns, that the medical practitioner would be well advised to send his account to his patient first before submitting it to the local authority. I have known patients grievously annoyed at having to

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undergo inquisition at the hands of officers of the local authority because, as they stated, they were quite willing to pay the fee, but had never had any account from their doctors. By the Midwives and Maternity Homes Act, 1926, a time limit of two months is imposed, within which period from date of attendance accounts from doctors must be submitted.

The importance of antenatal work is, at least theoretically, fully recognized. In my judgment it would have been preferable to ask that all antenatal examinations be carried out by medical practitioners. Many practising midwives have quite hazy notions on how to complete the Central Midwives Board antenatal forms.

When a maternity home is available for the reception of women whose home conditions are unsatisfactory it is wise to administer it so that practitioners will attend their patients therein, if the latter express the desire. In Blackburn there is a rota of doctors who attend, if needed, any cases who have not engaged a doctor; otherwise the patient's own practitioner attends as if the patient were at home. For small or moderate-sized maternity homes, a whole-time medical officer is, to my mind, not necessary. A consulting surgeon should be retained by the local authority to whom medical men may refer cases for a second opinion.

Although the subject of puerperal fever has been partially cleared up by the new Puerperal Fever and Puerperal Pyrexia (Notification) Regulations, 1926, yet there is no clear definition of puerperal fever. The incorporation of the term "puerperal pyrexia" has simplified notification, but this term is itself leading to complications of its own. Such conditions as mammary abscess or phlegmasia alba dolens hardly seem to come within the reference of the order, but such cases have already been notified.

(3) *Tuberculosis*.—The public health department is

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legislation is not much less in the highest than in the lowest strata. If the gospel of cleanliness in the province of food production and distribution is to pass from the theoretical to the actual, public opinion must demand clean goods; the careless tradesman will then have to reform or be squeezed out. A widespread demand for cleanliness will quickly be followed by a clean supply of food materials.

(6) *Industrial Hygiene*.—So far, public health departments have had little to do with this subject. It seems to be a waste of material, compiled at great expenditure of labour and money, for school records to be filed away and forgotten when once a child has left school. At present no use is made of them, although they are of value to the factory surgeon and the panel practitioner alike. In Blackburn we are prepared to furnish, as a confidential report to a medical practitioner, the school medical history of any child we have on our books, or who has left school since medical records were first instituted, and in whom he is interested.

In conclusion, I would stress the importance of continuing periodical medical examination into adult life. As the late Mr. C. P. Childe said, in his presidential address at the British Medical Association Annual Meeting held in Portsmouth in 1923 : "Concentrate on the prevention of disease, on strengthening resistance to disease by the improvement of environment, rather than on the search for cures or palliatives when the damage is already done. Give more attention to stimulating and fortifying the natural defensive mechanisms against disease, less to direct attack on disease itself. Concentration on the environment rather than on the individual appears to me to be the most scientific, the most economical, and the most productive means of combating the worse of the evils from which the community suffers."

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chiefly an auxiliary to the general practitioner services, and assists by selecting patients requiring early institutional treatment; whilst at the same time it relieves the practitioner from frequent attendance on unremunerative cases. The notification of tuberculosis has, for several reasons, never been very satisfactory. This may be partly owing to the patients' reluctance to seek advice—a matter for education—and partly to the unjustifiable reliance laid by some doctors on sputum examination. As an outcome of my own experience of some fourteen years, I am convinced that a positive sputum only occurs in a case clinically advanced, and which, in the majority of instances, ends fatally within five to seven years. For tuberculosis to be treated effectively it is necessary to treat cases early. Local authorities provide means for diagnostic procedures and are always ready to co-operate with private medical men in the combating of this scourge.

(4) *Venereal Diseases*.—Under the comprehensive arrangements made by the Ministry of Health through local authorities, any general practitioner is in a position to bring and keep himself in touch with modern technique in diagnosis and treatment. I believe it to be the general experience of venereal disease clinics and pathological laboratories that it is very rarely that they get any visits from general medical practitioners.

(5) *Food Supplies*.—The privileged position of the family doctor is eminently suitable for carrying on personal propaganda in the realms of home hygiene. Clean food and, above all, clean milk, are subjects concerning which much education is yet necessary among all classes. Some practitioners do not yet know the various grades of milk or the standards by which they are judged. It is not by any means the humbler class of person who necessarily needs educating in hygiene. Unhygienic conditions and habits are found in all strata of society, and ignorance of health

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The Treatment of Varicose Veins by Injection Methods.

By RONALD THORNHILL, M.B., Ch.B.

Honorary Surgeon, West Cornwall Infirmary, Penzance.

IT is not yet generally appreciated by practitioners in this country what splendid results are now being obtained by the injection method of treating varicose veins. The earlier results having been unsatisfactory in many ways, there remains a feeling that this treatment is still unsound in that there may be a danger from embolism; that the results are not permanent; or for other reasons. During the last two to three years, however, considerable advances have been made in the choice of the sclerosing solution employed and in technique. So much progress has been effected that it is now possible to show conclusively that the treatment by modern methods is free from any danger, lasting in its results, and in every way preferable to operative procedure.

I do not propose to discuss the relative value of the various solutions which have been used in the past. It will suffice to say that the excellent results gained in the last two years have nearly all been obtained by using either the Genevrier solution of quinine and urethane or by the Sicard solution of sodium salicylate. Having used several different solutions in my own practice during the past three years, I have found none to compare in efficiency with these two, although, on the whole, I prefer the Genevrier method, since the patient is free from the cramp which is present for a

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minute or so after the salicylate injection. Nevertheless, results have been equally excellent with both methods.

The constituents of the solution recommended by Genevrier are as follows :—

Urethane	-	-	-	-	2 grammes
Quinine hydrochloride	-	-	-	-	4 grammes
Distilled water	-	-	-	-	30 c.cm.

This is sterilized by boiling, and, as the quinine crystallizes out on cooling, must be immersed in a bowl of hot water before using. During the process the patient remains seated in an armchair, which position keeps the veins to be treated in a semi-distended state. The armchair is mounted on a dais, which enables one to perform the treatment without having to grovel on the floor. I prefer the sitting posture to having the patient lying on a couch, although this position is quite satisfactory if a tourniquet is used.

An ordinary 2 c.cm. Record syringe with a No. 17 surgical point is found to be most suitable. At the first treatment it is unwise to inject more than 1 c.cm. of the solution, for two reasons : first, the subject is not used to the process and may feel faint, not from any undue pain nor from any action of the solution employed, but purely from nervous causes ; and secondly, to allow for a possible quinine idiosyncrasy. In the few people who possess this anomaly a bitter taste is noticed soon after injection. In such cases a tourniquet is applied and gradually released at the end of the treatment. At subsequent treatments a total amount of 3 c.cm. is injected, representing 6 grs. of quinine, which amount rarely causes even a headache.

The skin over the vein to be treated is swabbed with ether, which is preferable to iodine or peric acid solution, in that no staining of the skin results and it is therefore easier to distinguish the vessel. The point of the needle is inserted into the lumen of the vein, which is proved by slightly withdrawing the piston, when venous blood will flow freely into the syringe. Half c.cm. is now injected, the needle removed and a pledget of wool pressed firmly over the puncture for 30 seconds. This process is repeated along the vein at intervals of 1 to 2 inches, and 4 to 5 injections are given. Each puncture is then cleaned with ether and sealed with collodion. Patients are required to remain quietly seated for a further five minutes, after which they are free to walk away and continue their normal routine until they are due for the next treatment. The sittings are continued until all the varicosities have been injected.

In order to show the suitability of the injection method of treatment it will be necessary first to dispose of the suggested dangers, the most obvious of which is embolism. When one of these sclerosing solutions is injected into the lumen of a varicose vein, the intima is chemically damaged, producing the *endoveinite* of

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I do not propose to discuss the relative value of the various solutions which have been used in the past. It will suffice to say that the excellent results gained in the last two years have nearly all been obtained by using either the Genevrier solution of quinine and urethane or by the Sicard solution of sodium salicylate. Having used several different solutions in my own practice during the past three years, I have found none to compare in efficiency with these two, although, on the whole, I prefer the Genevrier method, since the patient is free from the cramp which is present for a

VARICOSE VEINS

is not required to lie up, as against the surgical treatment which requires a minimum period of three weeks in bed and a probable week convalescing. The injection can be given in the consulting room and the patient is then free to walk away to continue his or her duties or pleasures. The amount of time taken will, of course, depend on the severity of the case; an average being about four treatments, at intervals of from four to eight days. Then there is the advantage that no anaesthetic is required, and this is a very decided one when we consider the antipathy most people have to undergoing this process, with its distressing after-effects, apart from the danger incurred, remote though it be in these days.

The question of pain must also be considered, and I can say that it is negligible. I have often tried to make patients say that the treatment was painful, but they have always refuted the suggestion. At the time of injection, using the Genevrier solution, the only pain whatever is produced by the entry of the needle, and as the finest Schimmelbusch needle is invariably used, this is very slight. The next morning, when the patient rises, stiffness is felt in the leg, but this gradually gets less as the day goes on, followed by a less degree of stiffness the following morning, and after that, as a rule, no further complaint is heard. On the other hand, in every case where aching of the veins has been pronounced, a feeling of alleviation has been noticed almost after the first treatment, and continues until, when all the veins have been treated, no distress at all is felt in the limb. It is also noticeable that the limb improves in colour and general appearance after completion of the treatment, due no doubt to the improved circulation.

One more advantage may appeal—that of comparative expense. In this treatment no nursing home, anaesthetic, nor “loss of time” expenses are

Sicard and Paraf, with its resulting thrombus. This artificial thrombus is unlike the thrombus of an infective condition in that it is remarkably tenacious and nonfriable, for it firmly adheres to the wall of the vessel until it is organized, and no portion of it becomes detached. It has been shown by histological methods that this artificial thrombus becomes organized very quickly and eventually produces a firm fibrous tissue result completely sealing the lumen of the vein. This process can be observed clinically from day to day, and the vein can be felt to shrink into a firm, cord-like structure which does not bulge the overlying skin.

Added to this evidence that portions of this resistant thrombus do not become detached,¹ Jentzer has shown radiographically that the circulation in varicose veins, when the leg is vertical or even raised to an angle of 45°, is in all cases centrifugal and not towards the heart; so that should an embolus become detached it will almost certainly move towards the finer veins and block these. Clinically the fear of embolism after injection is unwarranted, for in over 15,000 cases reported not one single case of embolism has been observed.

Given a proper and aseptic technique, there is only one other complication to be mentioned, namely, the possibility of local necrosis from perivenous injection. I have only seen this condition once, in a case in which I used sodium carbonate (a solution now totally discarded); but the danger is non-existent if the present solutions are employed.

Having shown the possible disadvantages of treatment, I should like to look at the other side of the picture, when I feel sure that it must be agreed that the advantages of this method of treatment considerably outweigh operative procedure, or, indeed, any other method of treatment of varicose veins. The first advantage of the injection method is that the subject

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The Treatment of Gastric and Duodenal Pain.

BY JOHN T. MACLACHLAN, M.D.

Late Assistant Physician, Royal Infirmary, Glasgow.

IN general practice, cases of gastric or duodenal pain are very common; and the treatment is not quite the same for both. The usual bismuth mixture, which generally relieves gastric pain, does not, as a rule, prove efficient for the relief of duodenal pain. Both types of pain are very frequent among young adults from 20 to 30 years of age; and I think that women are more frequently affected than men with the gastric pain, and men more than women with the duodenal pain. Both types of patient usually refer the pain to near the pyloric end of the stomach, usually below the xiphoid cartilage. The pain in women is, sometimes, referred to the small of the back. Gastric pain comes on shortly after the ingestion of food, and is not markedly relieved by food. It is not generally present when the stomach is empty; whereas duodenal pain is most marked about 2 to 3 hours after a meal, and is relieved, temporarily, after the ingestion of food, and is often very sharp, when the stomach is empty, and may be severe when the patient retires to bed.

Persistent gastric pain related to meals is diagnostic of gastric ulcer. If the ulcer is near the pylorus, causing pyloric spasm, nausea and even vomiting of food may be present. Gastric ulcers are especially apt to be found in young women with feeble circulations, cold feet and low blood pressure. That condition I regard as the predisposing cause of ulcers of the stomach. Septic teeth, and the habit of washing down the food with tea, are, probably, the chief causes

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incurred.

As for results, the following claim a great number of cases, all with excellent end-results :

Linser ²	-	-	-	-	6,000
Genevrier	-	-	-	-	4,000
Nobl	-	-	-	-	3,000
Douthwaite ³	-	-	-	-	2,000
Gaugier and Sicard ⁴	-	-	-	-	Several thousand.

In varicose ulcers Meisen claims that 98 per cent. of ulcers are curable by this treatment; and, indeed, in practice I have discovered no treatment which will cause healing in these ulcers so rapidly and surely as this treatment of the veins, combined with the exhibition of parathyroid and calcium as suggested by Sir Sidney Alexander.⁵ As regards varicose eczema, Meisen affirms⁶ that it is the only treatment with any chance of success.

In a certain number of cases, some of the veins treated become patent again and require a further treatment, and, as there is no contra-indication to this, another injection or two will effect a complete cure. In conclusion, it seems evident that the injection method of treating varicose veins is free from danger and presents the means of curing this distressing condition without loss of time and without the dangers and inconveniences of anaesthetic and surgical operation.

References.

¹ Jentzer, "Congrès Français de Chirurgie," 1925.

² Linser, "Die therapie der Gegenwart," 1925.

³ Douthwaite, "The Injection Treatment of Varicose Veins," 1927.

⁴ Sicard and Gaugier, *La Presse Médicale*, 1926.

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of indigestion and gastric ulcers.

The treatment of gastric ulcers is comparatively simple. First, the teeth must be efficiently cleaned by a dentist, and suitable mouth washes employed; a tooth brush is imperative. The patient should be impressed with the importance of keeping the mouth and teeth scrupulously clean. The teeth, therefore, should be brushed, at least, morning and evening. Tea with meals must be peremptorily stopped. Sir William Roberts pointed out that tea arrests the digestion of starchy food in the mouth; if so, it is no wonder that indigestion is so prevalent. Equal parts of milk and hot water may take the place of tea with meals, with great advantage. All vegetables should be prohibited, and the juice of two oranges or one lemon prescribed to take their place. I am in the habit of telling my patients that if they do not stop potatoes they need not come back to consult me. The potato is the worst offender; I presume, owing to the large starchy grains being difficult to break up and digest. The diet for gastric pain may consist, in cases of moderate severity, of milk and hot water, milk puddings, lightly boiled or poached eggs, fresh white fish, such as haddock, whiting, etc., and clear soups. Beef and mutton should be used in the form of clear soups to nourish the patients. If the gastric pain does not subside in a few days on the milk diet, then the patient should be put on clear soups, beef tea, chicken tea, etc., for several days. A good bismuth mixture should be prescribed, to be taken before meals and one dose to be taken at bedtime. The following mixture may be taken for three weeks :

R. Bismuth carb.	-	-	-	-	5iv
Sod. bicarb.	-	-	-	-	5iii
Spt. chlorof.	-	-	-	-	5ii
Glycerine	-	-	-	-	5i
Inf. gentian] ad.	-	-	-	-	5viii

Sig.: 5ss. for a dose.

GASTRIC AND DUODENAL PAIN

A little morphine or codein may be added, if necessary. When all pain and discomfort in the stomach have disappeared, the patient should be put on a mixture of iron and arsenic to tone up the stomach and prevent relapses. These medicines should be taken for three to six weeks. The following mixture is admirable :

R. Tr. ferri perchlor.	-	-	-	-	ʒii
Lig. arsenicalis hyd.	-	-	-	-	m48
Spt. chloroform	-	-	-	-	ʒii
Aq. ad.	-	-	-	-	ʒviii

Sig.: ʒss. in water after meals.

The management of duodenal pain is somewhat different. I consider that the best diet is a light one of eggs, fish and milk puddings; tea and tobacco must be prohibited. I am quite sure that tobacco is most injurious in those cases. Boiled mutton and fowl may be allowed; but, as in the treatment of gastric pain, all vegetables must be stopped. Bread, preferably toasted, may take the place of potatoes. The drug that is of most use is prepared chalk, given after meals, and at bedtime. The disease is associated with hyperchlorhydria, and the ordinary dose of bicarbonate of soda is practically useless. The carbonate of magnesia is also beneficial. The following is my favourite prescription for duodenal pain :

R. Bismuth carb.	-	-	-	-	ʒiv
Sod. bicarb.	-	-	-	-	ʒii
Magnes. carb.	-	-	-	-	ʒiii
Syr. codein.	-	-	-	-	ʒi
Mist. cretae ad.	-	-	-	-	ʒviii

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This may be given for several weeks. Later, a course of iron and arsenic should be prescribed. The bowels should be regulated by gentle aperients, rhubarb, cascara, etc. A return to a vegetable diet should be gradual, potatoes being the last article to be allowed. On these lines, my patients with gastric and duodenal pain have been cured; and, so far as I know, there have been no relapses.

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repeated infection the child, and especially the infant, must be separated from any active focus in the home. To prevent infection from becoming clinical disease, the principles involved in non-specific constitutional treatment are still of basic importance. In the treatment of active tuberculosis disease of the lungs, nodes and pleura, rest, fresh air, appropriate food and occasional laxatives comprise the chief factors. Ultraviolet radiations and exposure to direct sunlight are useful adjuncts, but cannot be applied indiscriminately.—(*Journal of the American Medical Association*, October 22, 1927, p. 1415.)

Serum Therapy in Scarlet Fever.

A. Schottmüller reports encouraging results from the use of anti-streptococcal serum in scarlet fever. Of fifty severe cases which were treated with this antiserum, twenty-seven developed complications, while of fifty untreated control cases complications occurred in forty-one. None of the treated cases was complicated by nephritis. The author emphasizes the importance of giving the antiserum as early as possible. In most of his cases it was given on the second or third day of the illness. The dosage was 25 c.c.m. for children, and from 50 to 75 c.c.m. for adults. This was repeated in the more severe cases after twelve to twenty-four hours. In many cases administration of the antiserum led to a rapid fall in temperature and pulse-rate.—(*Klinische Wochenschrift*, September 3, 1927, p. 1692.)

The Treatment of Lumbar Abscesses of Colic Origin.

H. Lorin and M. Laemmer recommend, in the treatment of lumbar abscesses of colic origin, that when it is known beforehand that the abscess is behind the colon a lumbar incision directed slightly outwards should be employed, or else a lateral paraperitoneal incision with freeing of the peritoneum. The former route of access is more certain when the exact position of the abscess is not known beforehand. After the operation the cause of the condition must be found and treated appropriately.—(*La Presse Médicale*, July 20, 1927, p. 913.)

The Diagnosis of Carcinoma of the Stomach in the Young.

V. Knapp observes that the symptomatology of cancer of the stomach in the young is no more constant than it is in patients of middle-age. The X-rays offers, perhaps, the best method of diagnosis, but even though a case in a young adult may suggest the diagnosis of malignancy clinically and radiographically, the practitioner is loth to reach such a conclusion, and rather think away from this diagnosis. This is undoubtedly a proper attitude, but he should keep the possibility of cancer in mind. The course of gastric carcinoma in the first three decades is usually more rapid and progressive than in later life, and the history is often a short one of

Practical Notes.

Sodium Salicylate as an Intravenous Injection.

G. Rosenthal has carried out many experiments to find the best medium for employing sodium salicylate as an intravenous injection without causing thrombosis or damage to the walls of the veins. He has come to the conclusion that the following formula is the best:

R Sodium salicylate - 1 g. (grs. xv)

Glucose, 30 per cent.

solution in water - 10 c.c.m. (5 ijij)

A 30 per cent. solution of glucose is the limit if the solution is to be easily sterilizable. The importance of sodium salicylate as an intravenous injection is mainly in the treatment of encephalitis lethargica.—(*Le Progrès Médical*, November 5, 1927, p. 1748.)

The Action on the Intestine of Liquid Paraffin.

E. Schlagintweit has made a study of the action of liquid paraffin on the intestine, and has come to the conclusion that it does not act as a lubricant, nor does it inhibit resorption. It cannot be classified among the cathartics; but must be included along with agar agar and similar substances which induce the evacuation of the bowel by their bulk. In the author's opinion the action of liquid paraffin is the result of a change in the consistency of fat and an increase in fluids.—(*Archiv für Experimentelle Pathologie und Pharmakologie*, July, 1927, p. 59.)

The Prognosis and Treatment of Tuberculosis in Childhood.

J. C. Gittings, F. W. Lathrop and S. A. Anderson publish an important study of tuberculosis in childhood. They observe that, next to treatment, prognosis most intimately concerns the patient, and yet, of all the subdivisions of medical study, prognosis lends itself least to scientific precision. Their study is founded on 681 cases of tuberculosis among the 31,068 patients admitted to the Children's Hospital of Philadelphia from 1907 to 1926, inclusive. The authors have come to the conclusion that the prognosis in active pulmonary tuberculosis is bad in inverse proportion to the increasing age of the patient. Involvement of bronchial nodes with only a few small discrete pulmonary foci—the primary lesions—gives a relatively favourable prognosis under proper conditions. Involvement of the pleura without recognizable involvement of the lung gives an expectancy for cure which also is relatively good. Children over three years of age who are tuberculin-positive without any clinical evidence of tuberculosis disease should show a large percentage of arrests, if they can be protected against reinfection and be properly supervised. To prevent massive or

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repeated infection the child, and especially the infant, must be separated from any active focus in the home. To prevent infection from becoming clinical disease, the principles involved in non-specific constitutional treatment are still of basic importance. In the treatment of active tuberculosis disease of the lungs, nodes and pleura, rest, fresh air, appropriate food and occasional laxatives comprise the chief factors. Ultraviolet radiations and exposure to direct sunlight are useful adjuncts, but cannot be applied indiscriminately.—(*Journal of the American Medical Association*, October 22, 1927, p. 1415.)

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A 30 per cent. solution of glucose is the limit if the solution is to be easily sterilizable. The importance of sodium salicylate as an intravenous injection is mainly in the treatment of encephalitis lethargica.—(*Le Progrès Médical*, November 5, 1927, p. 1748.)

The Action on the Intestine of Liquid Paraffin.

E. Schlagintweit has made a study of the action of liquid paraffin on the intestine, and has come to the conclusion that it does not act as a lubricant, nor does it inhibit resorption. It cannot be classified among the cathartics; but must be included along with agar agar and similar substances which induce the evacuation of the bowel by their bulk. In the author's opinion the action of liquid paraffin is the result of a change in the consistency of fat and an increase in fluids.—(*Archiv für Experimentelle Pathologie und Pharmakologie*, July, 1927, p. 59.)

The Prognosis and Treatment of Tuberculosis in Childhood.

J. C. Gittings, F. W. Lathrop and S. A. Anderson publish an important study of tuberculosis in childhood. They observe that, next to treatment, prognosis most intimately concerns the patient, and yet, of all the subdivisions of medical study, prognosis lends itself least to scientific precision. Their study is founded on 681 cases of tuberculosis among the 31,068 patients admitted to the Children's Hospital of Philadelphia from 1907 to 1926, inclusive. The authors have come to the conclusion that the prognosis in active pulmonary tuberculosis is bad in inverse proportion to the increasing age of the patient. Involvement of bronchial nodes with only a few small discrete pulmonary foci—the primary lesions—gives a relatively favourable prognosis under proper conditions. Involvement of the pleura without recognizable involvement of the lung gives an expectancy for cure which also is relatively good. Children over three years of age who are tuberculin-positive without any clinical evidence of tuberculosis disease should show a large percentage of arrests, if they can be protected against reinfection and be properly supervised. To prevent massive or

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this age. He gives details of eight such cases. In all of them, the disease was of an extremely severe type, as evidenced by exaggeration of the usual clinical signs of infantile rickets. Ordinary antirachitic treatment proved quite inadequate. It was only when huge doses of cod liver oil were given along with abundant exposure to the sun's rays that proper healing was obtained.—(*American Journal of Diseases of Children*, October, 1927, p. 624.)

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J. E. Paterson discusses the treatment of aneurysm of the common carotid artery and gives full notes of a case personally treated. Extirpation of the sac, the "old operation" of Antyllus, was revived by Syme, but few operators have been tempted to imitate him in what must have been one of the most spectacular operations of surgery. Mr. Paterson, having first tried the effect of needling by Macewen's method, has come to the conclusion that the operation of proximal ligation by Perthes' method is the best and safest procedure in this condition. The artery is exposed above the omohyoid, and a fascial strip passed round it and tied and sutured in position. Mild cerebral symptoms for about a week, and numbness and weakness in the right arm and leg for some five weeks, were present after the operation; but these gradually passed off.—(*Glasgow Medical Journal*, October, 1927, p. 207.)

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F. S. Newell is of opinion that in every cardiac case, no matter how mild, pregnancy should be carefully supervised in order to avoid unnecessary strain on the heart. Definite rules for the conduct of pregnancy in patients with moderate cardiac disease should be laid down and their importance explained, and if the patient is unable or unwilling to follow this routine the termination of pregnancy is the only safe course. The patient should be seen at least once a week throughout pregnancy and should be examined carefully for signs of approaching failure, including oedema, dyspnoea, cyanosis, cough, haemoptysis, râles in the lung and so forth. The urine should be examined for albumen once a week. Active exercise should be forbidden; fresh air and sunlight are best provided for by driving or sitting in the sun at an open window. The patient should spend two hours a day and one day a week in bed during the first seven months, and three hours a day and two days a week during the last two months. If any signs of failure develop, absolute rest in bed should be insisted on; and if the signs increase in spite of rest, prompt delivery by Cæsarean section under local anaesthesia followed by sterilization will prove the most satisfactory treatment.—(*Boston Medical and Surgical Journal*, November 3, 1927, p. 757.)

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Reviews of Books.

Diathermy. By ELKIN P. CUMBERBATCH, M.A., B.M. Pp. 332.
London : Wm. Heinemann (Medical Books), Ltd. 21s. net.

THE advances which have taken place during the last six years, since the first edition of this handbook on diathermy was published, have necessitated not only a second edition, but a revision and considerable addition to the original text. Both the apparatus and the technique have been improved, and the field of utility of this treatment has been extended, especially in connection with gonorrhœa in women, where its application to the infected cervix uteri, and to the ovaries, has given excellent results. The new edition will be welcomed by all those interested in this branch of medicine.

Chronic Pulmonary Catarrh. By DUNCAN LEYS, M.B., M.R.C.P.
Pp. viii + 130. London : H. K. Lewis & Co., Ltd. 7s. 6d. net.

THIS book, as the author states, attempts to give a greater precision to ideas regarding a very common type of respiratory infection. It is in no way a collection of theoretical arguments, but a clinical study based upon the results of an endeavour to trace the medical histories of patients presenting the condition known as "fibroid lung" or "chronic pneumonia." There can be no doubt that, since Koch's discovery in 1882 of the *Bacillus tuberculosis*, the tendency has been to regard the great majority of pulmonary conditions as tuberculous. We welcome a book such as this, which draws attention to the fact that such a condition as a non-tuberculous form of pulmonary fibrosis exists. The author gives a comprehensive account of its history and a clear description of its clinical syndrome, and then goes on to deal with the question of the infective agent. The relation of Pfeiffer's bacillus to epidemic influenza and to acute and chronic respiratory diseases receives full attention. He wisely points out that it is notoriously difficult to attach significance to the discovery of any particular organism in the sputum, and so far there is no conclusive evidence to incriminate this bacillus as the cause of non-tuberculous pulmonary diseases. Various factors, however, such as the very frequent appearance of the organism in cases of a like clinical type, the disappearance of the organism after recovery from the disease and its reappearance in the excretions during exacerbations, cannot but be regarded as fairly strong circumstantial evidence in favour of this bacillus having something to do with the production of the various conditions discussed. Complications, X-ray appearances, prophylaxis, treatment and prognosis are all carefully dealt with, and a very valuable part of the book comes at the end, where 100 cases of chronic pulmonary catarrh are reported.

Preparations, Inventions, Etc.

MAGNESIA OIL.

(London Distributors : Messrs. Thos. Christy & Co., 4-12, Old Swan Lane, E.C.4.)

Magnesia oil is manufactured by the Musterole Fine Products Company, London, and consists of magnesia and liquid paraffin in an emulsion of creamy consistency. The association of an antacid with a laxative should frequently be useful in the treatment of gastro-intestinal disorders, as hyperacidity and constipation often occur together, and this preparation is pleasant to take and has no after-taste.

SYNTHALIN.

(London : Messrs. Schering, Ltd., 3, Lloyds Avenue, E.C.3.)

Synthalin is a synthetic preparation, a guanidine derivative combined with alkali, for the treatment of diabetes, which from the clinical reports so far available appears to exert the same action as insulin. Its chief advantage is that while insulin is valueless when taken by the mouth, synthalin does exercise its effect when administered orally, as it is not affected by the digestive juices and is absorbed from the alimentary canal unchanged. It is taken in the form of tablets, with some fluid, before meals. Cases of diabetes of slight or medium severity are most suitable for treatment with synthalin, and it is well to begin treatment after the tolerance threshold has been determined by means of a regulated diet.

RADIOSTOL PELLETS.

(London : The British Drug Houses, Ltd., 16-30, Graham Street, N.I.)

Radiostol is a preparation which we noticed not long ago in our pages, and is irradiated ergosterol, valuable for its vitamin D content. It is now being made in the form of pellets, each sugar-coated pellet having incorporated in it a measured quantity of radiostol. This will no doubt be found to be a convenient form for administration, as the pellets can be swallowed whole or eaten at will, being quite palatable.

AMPACOIDS.

(London Agents : Messrs. Coates & Cooper, 41, Great Tower Street, E.C.3.)

Ampacoids is the name given to a series of sterile solutions for subcutaneous or intramuscular injection, prepared by original methods in the laboratories of Messrs. Reed and Carnrick, Jersey City, U.S.A. "Ampacoids, Ovary," contain active ovarian hor-

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Part I.

THIS article is intended for general practitioners, with whom must chiefly rest all progress in the prevention and treatment of pneumonia. Hospital physicians have not much to do with prevention, and the ultimate results of the cases which they see either in hospital or in private are not infrequently determined beforehand, so that there is not much to do except watch the progress of the cases and take credit for cures effected by Nature. The consultant is not paid by results, so he backs a "dead certainty." As general practitioners are, and should be, the guides, philosophers and friends of the public, and as such have to deal with pneumonia in both sexes and at all ages, I shall treat the subject in its broadest aspects.

With the great fall in the birth-rate there has been a

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mones, and are suggested in amenorrhœa, dysmenorrhœa, etc. "Ampacoids, Prostate," contain active prostatic hormones and are suggested in prostatic hypertrophy, etc. "Ampacoids, Testicle," contain active testicular hormones and are suggested in impotence and all forms of hypogonadism.

BALNEO PRODUCTS.

(London : Balneo Products (London), 8, Lower James Street, Golden Square, W.I.)

Balneo Products are the natural salts from the Kissingen and Reichenhall springs, and are prepared under government supervision at the source. The range of preparations includes brine bath Nos. 1, 2 (with dwarf pine oil), and 3 (with Latschen pine oil), gargling salts, drinking salts, Reichenhall throat tablets, Reichenhall cream-coated bonbons, eau-de-cologne bath salts (consisting of the salts of Reichenhall spa water), iodine table salt, Kissingen pills (made of Kissingen spring salt with the addition of rhubarb and cascara sagrada), and Kissingen Rakoczy tablets (produced from the Kissingen Rakoczy well with the addition of a neutral binding agent). With such a comprehensive choice as the above afford, the spa treatment would seem to be as effective in the home as abroad.

BISMOGENOL.

(London Agents : Messrs. Boxall, Smith & Co., 163a, Strand, W.C.2.)

Bismogenol is a compound, manufactured by Messrs. E. Tosse & Co., of Hamburg, which contains 59-60 per cent. of bismuth combined with physiologically active oxybenzoic acid. It is employed as an intramuscular injection in the form of an emulsion of the salt in highly refined olive oil. There is no doubt that such a bismuth salt as this is highly efficacious in the treatment of all stages of syphilis, especially those cases which are refractory or hypersensitive to salvarsan or mercury, and the advantages of this preparation are the painlessness of the injections, the absence of injurious secondary effects, and the infrequency of relapses.

NEW-MIX.

(London : Gilmont Products, Ltd., 35, Crutched Friars, E.C.3.)

New-mix is a tooth paste which has some new ideas about it. One tube containing fruit extracts is ingeniously placed within another tube containing alkaline substances, and by squeezing the tubes the pastes mix together and effervesce at the moment of use. It appears to be a highly efficient dentifrice.

A NEW MEDICAL PUBLISHER.

We are interested to learn that Messrs. Jonathan Cape, Ltd., of 30, Bedford Square, London, have decided to add the publication of medical books to their activities. We are informed that the services of a medical adviser have been secured and that a number of important works will be published during 1928. The high standard of production of books issued by this firm is well known, and it will be interesting to see how far this standard will be applied to the publication of medical textbooks.

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With the great fall in the birth-rate there has been a

corresponding fall in the death-rate. The crude death-rate from all causes has fallen from 14·3 in 1916 to 11·6 in 1926 per 1,000 living. This fall would have been much greater but for the great increase which has taken place in diseases of the circulatory system and in cancer. The deaths from cancer per million population have risen from 1,161 in 1916 to 1,362 in 1926, and diseases of the circulatory system from 1,962 to 2,160; if one includes, as I think one should, cerebral haemorrhage, then one raises the deaths in 1926 to 2,856 to the million living. This does not say much for prevention or treatment, though heart specialists swarm like bees.

It is now pleasant to look at a brighter side of the picture. Tuberculosis has fallen, though not much, during the last few years. To the million living, respiratory diseases have fallen from 2,500 in 1916 to 1,736 in 1926; bronchitis from 1,243 to 773; pneumonia from 1,061 to 828, and influenzal pneumonia adds 97, making a total of 925 deaths from pneumonia in the million population.

We are frequently told by those pessimists who decry the falling birth-rate that we will soon have a population of old people, and that the death-rate will rise. So far this has not matured; on the contrary, the death-rate from old age has fallen from 919 in 1916 to 629 in 1926; so there is still some hope for the old stagers. It is quality, not quantity, which we want, and I am confident that if our population started life from a healthy germ plasm we would have healthier, happier and longer lives.

We have seen that the death-rate from pneumonia, without including cases associated with measles, whooping cough and other infectious diseases, is 925 to the million living. In 1911 I reckoned the incidence of this disease at 1 per cent. of the population in Glasgow and Liverpool, and I do not think that this would be an unfair average for the whole of England and Wales.

PREVENTION OF PNEUMONIA

An incidence of 1 per cent. and a death-rate of 10 per cent. would give 1,000 deaths to the million population, which is not far from the recorded number, 925. A 10 per cent. death-rate is much lower than most statistics give. We often meet with practitioners who never seem to have a death from pneumonia; but such men have very little experience of the disease except in healthy suburban or country areas. About 75 per cent. of cases recover under any treatment, and often in spite of treatment, so that a lucky practitioner might run a long time without seeing a death.

In my opinion the low average death-rate of 10 per cent. is much too high for a short, acute illness. Sir Berkeley Moynihan recently said that if he had a death-rate of 10 per cent. in duodenal ulcer he would give up surgery. I wonder how many physicians with a death-rate of 10 per cent. in pneumonia would give up medicine! We must try to lessen the incidence as well as the mortality of pneumonia. The death-rate from pneumonia during the first few years of life is very heavy. In 1926 there were under one year 4,023 male and 2,957 female deaths. From one to five years there were 3,516 male and 3,072 female deaths. Thus the deaths from pneumonia under five years equalled 42 per cent. of the total deaths from that disease. From this high peak there is a marked decline up to fifteen years; after this there is a slow rise to forty-five years; then a more rapid rise up to seventy. During the whole of this period the deaths of males preponderate. From seventy onwards there is a decline with a preponderance of female deaths, no doubt because the female population is greater.

In 1926 the infant mortality under one year was 70 to the 1,000 births, and of these the deaths from pneumonia were 10·05, and from bronchitis 4·23; thus one in five of the total deaths was from these two diseases. It is difficult to arrive accurately at the

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PREVENTION OF PNEUMONIA

An incidence of 1 per cent. and a death-rate of 10 per cent. would give 1,000 deaths to the million population, which is not far from the recorded number, 925. A 10 per cent. death-rate is much lower than most statistics give. We often meet with practitioners who never seem to have a death from pneumonia; but such men have very little experience of the disease except in healthy suburban or country areas. About 75 per cent. of cases recover under any treatment, and often in spite of treatment, so that a lucky practitioner might run a long time without seeing a death.

In my opinion the low average death-rate of 10 per cent. is much too high for a short, acute illness. Sir Berkeley Moynihan recently said that if he had a death-rate of 10 per cent. in duodenal ulcer he would give up surgery. I wonder how many physicians with a death-rate of 10 per cent. in pneumonia would give up medicine! We must try to lessen the incidence as well as the mortality of pneumonia. The death-rate from pneumonia during the first few years of life is very heavy. In 1926 there were under one year 4,023 male and 2,957 female deaths. From one to five years there were 3,516 male and 3,072 female deaths. Thus the deaths from pneumonia under five years equalled 42 per cent. of the total deaths from that disease. From this high peak there is a marked decline up to fifteen years; after this there is a slow rise to forty-five years; then a more rapid rise up to seventy. During the whole of this period the deaths of males preponderate. From seventy onwards there is a decline with a preponderance of female deaths, no doubt because the female population is greater.

In 1926 the infant mortality under one year was 70 to the 1,000 births, and of these the deaths from pneumonia were 10·05, and from bronchitis 4·23; thus one in five of the total deaths was from these two diseases. It is difficult to arrive accurately at the

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corresponding fall in the death-rate. The crude death-rate from all causes has fallen from 14·3 in 1916 to 11·6 in 1926 per 1,000 living. This fall would have been much greater but for the great increase which has taken place in diseases of the circulatory system and in cancer. The deaths from cancer per million population have risen from 1,161 in 1916 to 1,362 in 1926, and diseases of the circulatory system from 1,962 to 2,160; if one includes, as I think one should, cerebral haemorrhage, then one raises the deaths in 1926 to 2,856 to the million living. This does not say much for prevention or treatment, though heart specialists swarm like bees.

It is now pleasant to look at a brighter side of the picture. Tuberculosis has fallen, though not much, during the last few years. To the million living, respiratory diseases have fallen from 2,500 in 1916 to 1,736 in 1926; bronchitis from 1,243 to 773; pneumonia from 1,061 to 828, and influenzal pneumonia adds 97, making a total of 925 deaths from pneumonia in the million population.

We are frequently told by those pessimists who decry the falling birth-rate that we will soon have a population of old people, and that the death-rate will rise. So far this has not matured; on the contrary, the death-rate from old age has fallen from 919 in 1916 to 629 in 1926; so there is still some hope for the old staggers. It is quality, not quantity, which we want, and I am confident that if our population started life from a healthy germ plasm we would have healthier, happier and longer lives.

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Although the expansion of the chest at birth must have been known from time immemorial, it was the late Dr. Albert Abrams who first discovered the pulmonic reflexes, and he did so long before Dixon and Brodie demonstrated the nerve supply to the lungs. When the child appears, the change of environment makes it gasp a few times, and then it howls; but if it does not it should be made to do so, and do so vigorously, by a few slaps with a cold, wet towel. The gasps take a little air into the chest, but it requires the expiratory howls to compress that air and expand the alveoli.

The atmospheric pressure during inspiration is not sufficient to blow out the air vesicles; this can only be done by raising the intra-pulmonary pressure above that of the atmosphere, which is accomplished by the child howling, and it should be made to continue gasping and howling until the lungs are fully expanded. If the child be too feeble to expand its lungs, you may treat it the way Elisha treated the Shunammite's child: blow your breath into its mouth or nostrils, and your carbonic acid will get into the lungs, and thence into the circulation and stimulate the respiratory centre. Of course, the prophet had not a foul breath stinking with nicotine. Whatever means one adopts—and as far as possible it is best to make the child do its own work—you should see that the lungs are expanded to their fullest capacity. You thus establish an intra-thoracic and an intra-pleural negative tension which, barring disease or accident, should keep the lungs expanded for the rest of life. If the lungs be not fully expanded, the atmospheric pressure drives in the soft, pliant chest-walls during inspiration; this is well exemplified in cases of adenoids, diphtheria and wherever there is any obstruction to the entrance of air to the chest.

A healthy, vigorous infant with good respiratory capacity should not be liable to any disease, but,

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incidence of these two diseases under one year, but we know that the death-rate is 14 out of the 1,000 births, and as the death-rate is usually reckoned at 30 to 50 per cent., we can multiply by the lowest figure, which would give an incidence of forty-two cases, or 4 per cent. of the total births, which is four times the incidence which I reckoned for the whole population at all ages. Under one year of age the diagnosis between pneumonia and bronchitis is not sharply drawn; the personal equation comes largely into play as to whether a case is termed pneumonia, broncho-pneumonia or bronchitis. The first term is the most popular at present, but for our purpose I think it is better to link them all together.

The death-rate per 1,000 births has fallen from 91 in 1916 to 70 in 1926, and that from pneumonia and bronchitis from 17 to 14; thus, while the general death-rate has fallen 2 per cent., that from these two diseases fell only 0·3 per cent.

We must now consider how to lessen the incidence and death-rate from pneumonia and other respiratory diseases.

The primary object of the respiratory function is to oxygenate the blood and get rid of carbonic acid gas. This is largely a mechanical process controlled by the nervous system, and the greater the vital capacity under all circumstances the more easily is this function carried out. I entered very fully into the physics of the chest in my Bradshaw lecture,¹ and also in a post-graduate lecture on that subject.² These lectures gave rise to some controversy at the time, but I still adhere to the tenets there laid down, and I can commend them to all those who wish to study the subject minutely. Personally, I should not trust anyone to treat my chest who had not a good knowledge of the physics thereof. The vital capacity is established at birth by the excitation of the pulmonic reflexes.

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unfortunately, a large number of children are not healthy and not fit inhabitants for this austere world. One-sixth of the total deaths occur under five years of age, and of these one-fourth are due to pneumonia and bronchitis.

In order to keep healthy lungs from infancy to old age you must maintain and develop a good vital capacity. To stimulate the pulmonic reflexes the child should be rubbed over with a cold, wet sponge after the bath night and morning, and dried with a coarse towel. As the cooling surface of a child is great, compared with its weight and heat-generating mechanism, it should be warmly clothed, but not over-clothed, be out of doors whenever practicable, breathe a cool, dry air, and all the better if it be in motion, which stimulates deep breathing and increases metabolism. The child should be properly fed, but not overfed, and its bowels should be moved several times daily.

The plainer the food the better; it is not necessary to stuff the child with patent foods and vitamins about which you can get any amount of advice, free, gratis and for nothing; but when the mother comes to buy the stuff she rarely gets value for her money. Anything which is shoved down one's throat by an advertisement is not always easily digested. When a tradesman sells one a food loaded with vitamins, about which he knows nothing, there is usually "a fly in the ointment." Milk, orange juice, wholemeal and other natural products will answer better. When the child gets its teeth one should take Dr. Harry Campbell's advice and make it exercise its teeth and jaws. There is, perhaps, rather too much talk in the present day about manufacturing health, and those who talk loudest would cut sorry figures in the trenches.

I got my good health from my parents, and I have managed to keep it, notwithstanding very many risks to life and limb. This constant parrot-cry of "Safety

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first" is not the way to build up any nation.

Numerous children, especially those who live in close, stuffy atmospheres, suffer from defective action of the thyroid accompanied by enlarged tonsils, adenoids and undergrowth. These conditions can be obviated by making the child live in the fresh air, and there should be suspended in an open vessel in the dormitory a large lump of iodine. In some cretinoid conditions it is necessary also to give thyroid gland, but, as a rule, it is much better to make the thyroid do its own work by stimulating it with iodine.

Youths should maintain their health, physique and vital capacity by plenty of outdoor exercise. There is no better exercise for developing the vital capacity than hill climbing, and this applies to all ages, except in advanced ages where the costal cartilages are rigid and the blood vessels degenerating.

The vital capacity consists of the complementary, tidal, and reserve air, as measured by a spirometer. About the best work on the subject is that by Hutchinson, published in 1846, and can be found in any book on physiology. Hutchinson found that a person of 5 ft. showed an average vital capacity of 175 cubic inches, and for every additional inch to 6 ft. there were eight additional cubic inches of air. He found that there was an increase of one cubic inch per pound from 105 to 155 lb., and from 155 to 200 there is a loss of one inch to the pound; the vital capacity increased with age up to thirty years, and from thirty to sixty years it decreased 1·43 cubic inches a year. Hutchinson found that there was no direct relationship between the circumference of the chest and the vital capacity. In emphysema one may have a very big barrel-shaped chest and a poor vital capacity. The spirometer is often more useful than a stethoscope, but I cannot expect every one of my readers to purchase a spirometer. The following is a simple measure

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which will give all the necessary information. Stand erect, take a deep breath, and see how many you can count during the single expiration. If you can count seventy and over your vital capacity is all right. There has been also much laborious work of late in determining the basal metabolism, especially in cases of hyperthyroidism. I find that any one who can hold his breath in expiration for forty seconds has no excessive basal metabolism. Of course you must not establish beforehand any acapnia by rapid and deep breathing, which clears out the carbonic acid.

The vital capacity of women is less than that of men, and in them the percentage mortality from pneumonia is greater although the incidence is less. Pneumonia is frequently a terminal complication of many diseases, such as measles, whooping cough, influenza, typhus, typhoid, diphtheria, anthrax, glanders, surgical operations, intra-capsular fracture of the femur, and old age.

Pneumonia is an infectious disease, generally due to the pneumococcus, though frequently many other micro-organisms play an important part. The infectivity of the pneumococcus is not very high, so its determination is almost entirely a matter of environment and climatic conditions. We have seen that the incidence is greater in males as they run greater risks, while the relative mortality is greater in females as their vital capacity is less.

Pneumonia is largely a disease of town life, as in all parts of the country morbidity increases with urbanization, though the country boroughs of the south suffer less than the rural districts of the north. In London the death-rate from pneumonia, bronchitis and tuberculosis is high, no doubt partly due to the fogs. The death-rate often varies immensely even in the same city. Dr. Chalmers showed that in Glasgow in 1912 the death-rate in the different wards to the million population varied from 2,989 in Blackfriars to 519

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in Kelvinside. In the wards with a high birth-rate there was also a high death-rate—Nature has her compensations. Dr. Chalmers also showed that the housing was an important factor; in apartments of one and two rooms the death-rate was about 50 per cent. greater than in those of four rooms and upwards, while if you took all respiratory diseases the increase was nearly 100 per cent. Dr. Chalmers also pointed out “how rapidly fog and low temperature, when combined even for a short period, are disastrous alike to persons at both extremes of life.”

Pneumonia occurs in all climes, and is fairly common in many tropical countries; whereas bronchitis increases in frequency as we go north. In this country pneumonia attains its maximum about December and January, and is about twice as frequent in the winter and spring months as it is in the summer and autumn. Cold, damp atmosphere with sudden changes in temperature seems to be the determining cause. It is less frequent among those who lead a healthy, outdoor life than among those who work in ill-ventilated and insanitary buildings. Cold, dry air is not inimical, and none of the polar expeditions seems to have suffered from it. Exposure during sleep increases the predisposition, and this is no doubt due to the lessened control of the nervous system. This applies more especially to the aged and young, whose resisting powers are easily enfeebled. Consumptives and others who can keep the furnace burning within, readily withstand the cold air in their bedrooms, though draughts of cold, damp air may easily induce catarrhal conditions.

Frequent draughts of alcohol are, in my opinion, more potent causes than those of cold air. Anything which depresses the functions of the pneumogastric nerves is an important determining cause. A high barometric pressure, and the atmosphere charged with

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contend that it is the only cause of the very large and varied class of diseases which, according to our present classification, we group under the specific or generic head of pneumonia.

The pneumococci, of which four types have been described, usually exist as harmless saprophytes in the mouth and upper air passages. What, then, are the predisposing causes which give rise to their cultured malignancy in the air cells causing a serious disease, which, as we have seen, occurs in all climes and at all ages ? My own opinion is that the chief predisposing cause is damage to the function of the pneumogastric nerve or nerves which leads to congestion of the lungs and an outpouring of serum into the air vesicles of the affected parts. This forms a good culture medium, which enables the pneumococci to multiply and find their way with their toxins into the circulation. That the virulence of the toxins varies very much is shown by the fact that the violence of the attack and the degree of delirium are not always dependent on the amount of lung tissue involved.

The varied types of the disease would lead one to infer that one should use an autogenous vaccine; but the disease runs too rapid a course to admit of this slow procedure, so one must use the best stock vaccine one can get for the prevalent type of the disease, or a mixed vaccine. I have recorded three very severe cases of streptococcal pneumonia cured by anti-streptococcus serum.

In surgical practice cases of pneumonia due to some infective pyæmic organism are not at all uncommon. In operations in the mouth and throat, pneumonia is especially frequent. In my opinion, when possible, no operation should be undertaken in this region until a careful examination of the flora of the mouth and throat has been made for pathogenic organisms and a suitable vaccine administered. Long before vaccines

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positive electricity, are inimical to the origin of pneumonia and of advantage in its treatment.

There is a certain amount of individual as well as racial immunity, but I think this is relative, and rarely, if ever, absolute. I believe I am fairly immune, but I should not now take any unnecessary risks. In January 1909 my son and I were lost while climbing, in light clothing, the three peaks of the Gemmelalphorn; we spent the night in a blizzard with the temperature much below freezing point, and part of the time we were plodding through snow up to our waists. Moreover, we had been sixteen hours without food when we were discovered early in the morning by a party of Swiss guides sent out by my wife the previous night. We were brought down about three o'clock in the afternoon after a very unpleasant experience. Neither of us got pneumonia.

Negroes seem to be very susceptible to this disease, and their mortality is very high; this has been lessened of late on the Rand by acclimatization and the proper use of appropriate vaccines. The genius of Almroth Wright has been of greater advantage to humanity in the prevention of disease than in its treatment. I am pleased to say that I was among the first to recognize the great value of his work. The immunity acquired from a vaccine or even from an attack of pneumonia is not of long duration, but even a short immunity is often of great value, and a vaccine at the commencement of an attack frequently aborts it, or materially lessens its duration, and consequently the mortality.

ETIOLOGY.

There can be no doubt that the pneumococcus, either alone or in association with other pathogenic organisms, is the chief cause of pneumonia or pneumonic fever in the vast majority of cases; but no one will

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contend that it is the only cause of the very large and varied class of diseases which, according to our present classification, we group under the specific or generic head of pneumonia.

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came into vogue my friend, Mr. Paul, adopted my suggestion that, in cases of cancer of the mouth and tongue, before operation the patient should receive for a week large doses of chloride of calcium, and a dose of antistreptococcus serum should be administered on each of the three preceding days; after that, he had no more pneumonia in such cases.

Croupous pneumonia starting and ending abruptly is due to the pneumococcus, but as we have often a variety of micro-organisms at work, we should recognize the true nature of each individual case, and recollect that it is the patient rather than the disease which we have to treat. Everyone who has to deal with this dire disease should feel his responsibility, try to prevent its occurrence, and, when that fails, try to carry the patient safely through the illness. It is often very appalling to see the bread-winner of a large family cut off in the vigour of manhood after a few days' illness.

The way to prevent pneumonia is to raise the resisting power of the individual—make him as far as possible immune; hence, you should encourage temperance in all things and the avoidance of all debilitating agencies, such as undue exposure, over-fatigue, work in an insanitary, stagnant, moist atmosphere. There should be an abundant supply of fresh moving air night and day; the body temperature should be maintained by a proper supply of food, and there should be suitable external clothing to assist the regulative mechanism of the body in maintaining and distributing the heat which it has generated. Warm, dry feet should be a special feature; they can be easily kept warm by exercise, and when wet the boots and stockings should be changed. I cannot place my bare foot on a cold stone without the induction of an attack of sneezing. Of course, with a little training I could readily acquire an immunity; but it is not worth the trouble, and an

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occasional sneeze is good for my vital capacity. A fever patient may be packed in ice so long as his temperature is high, but if this treatment be continued till the temperature has fallen to normal, it will continue to fall still further, and the patient will be very apt to get congestion and œdema of his lungs—the damage to the pneumogastric may be irreparable.

A corpulent individual is not particularly prone to this disease; but a fat, flabby man, perhaps with a heart infiltrated with fat, and who gets out of breath on the slightest exertion, has a very poor chance when he develops an attack of pneumonia. People should be encouraged to develop muscle, rather than fat, by plenty of outdoor exercise.

Alcohol lowers the resisting power and so increases the incidence and mortality. On the other hand, gouty individuals who eat well and drink moderately, or perhaps rather freely, are not particularly prone to this disease, and the mortality is low. In fact, cases of high blood-pressure, *ceteris paribus*, usually pass easily through an attack of pneumonia.

A septic condition of the mouth increases the virulence of the pathogenic organisms; hence, a foul-mouthed individual is a greater danger to himself than to others. The mouth, teeth, throat and nasal passages should always be kept as clean and aseptic as possible.

A cool bath and physical exercises each morning improve the vitality and general resisting powers of the individual. I have myself a cold bath each morning summer and winter without tempering the wind to the shorn lamb, but I am afraid I often neglect the exercises.

In the next issue of THE PRACTITIONER I shall deal with the subject of treatment.

References.

¹ British Medical Journal, November 9, 1907.
² Ibid., April 19, 1919.

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came into vogue my friend, Mr. Paul, adopted my suggestion that, in cases of cancer of the mouth and tongue, before operation the patient should receive for a week large doses of chloride of calcium, and a dose of antistreptococcus serum should be administered on each of the three preceding days; after that, he had no more pneumonia in such cases.

Croupous pneumonia starting and ending abruptly is due to the pneumococcus, but as we have often a variety of micro-organisms at work, we should recognize the true nature of each individual case, and recollect that it is the patient rather than the disease which we have to treat. Everyone who has to deal with this dire disease should feel his responsibility, try to prevent its occurrence, and, when that fails, try to carry the patient safely through the illness. It is often very appalling to see the bread-winner of a large family cut off in the vigour of manhood after a few days' illness.

The way to prevent pneumonia is to raise the resisting power of the individual—make him as far as possible immune; hence, you should encourage temperance in all things and the avoidance of all debilitating agencies, such as undue exposure, over-fatigue, work in an insanitary, stagnant, moist atmosphere. There should be an abundant supply of fresh moving air night and day; the body temperature should be maintained by a proper supply of food, and there should be suitable external clothing to assist the regulative mechanism of the body in maintaining and distributing the heat which it has generated. Warm, dry feet should be a special feature; they can be easily kept warm by exercise, and when wet the boots and stockings should be changed. I cannot place my bare foot on a cold stone without the induction of an attack of sneezing. Of course, with a little training I could readily acquire an immunity; but it is not worth the trouble, and an

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occasional sneeze is good for my vital capacity. A fever patient may be packed in ice so long as his temperature is high, but if this treatment be continued till the temperature has fallen to normal, it will continue to fall still further, and the patient will be very apt to get congestion and œdema of his lungs—the damage to the pneumogastric may be irreparable.

A corpulent individual is not particularly prone to this disease; but a fat, flabby man, perhaps with a heart infiltrated with fat, and who gets out of breath on the slightest exertion, has a very poor chance when he develops an attack of pneumonia. People should be encouraged to develop muscle, rather than fat, by plenty of outdoor exercise.

Alcohol lowers the resisting power and so increases the incidence and mortality. On the other hand, gouty individuals who eat well and drink moderately, or perhaps rather freely, are not particularly prone to this disease, and the mortality is low. In fact, cases of high blood-pressure, *ceteris paribus*, usually pass easily through an attack of pneumonia.

A septic condition of the mouth increases the virulence of the pathogenic organisms; hence, a foul-mouthed individual is a greater danger to himself than to others. The mouth, teeth, throat and nasal passages should always be kept as clean and aseptic as possible.

A cool bath and physical exercises each morning improve the vitality and general resisting powers of the individual. I have myself a cold bath each morning summer and winter without tempering the wind to the shorn lamb, but I am afraid I often neglect the exercises.

In the next issue of THE PRACTITIONER I shall deal with the subject of treatment.

References.

¹ *British Medical Journal*, November 9, 1907.
² *Ibid.*, April 19, 1919.

Some Modern Methods in the Treatment of Pulmonary Tuberculosis.

By L. S. T. BURRELL, M.D., F.R.C.P.

*Physician to the Royal Free Hospital, and to the Brompton Hospital
for Consumption and Diseases of the Chest.*

THE management of a case of pulmonary tuberculosis consists in attending to many details and varying the treatment according to the stage or type of the disease and needs of the patient. There is no one cure for consumption, but there are many weapons which can be used in different combinations to attack it. Success in treatment depends on the judicious use of these weapons. In this article in THE PRACTITIONER I propose to discuss the values of three methods of treatment, namely : (1) Artificial pneumo-thorax ; (2) sanocrysin ; and (3) serum.

Artificial pneumothorax.—This consists in introducing gas between the visceral and parietal layers of pleura and thus allowing the lung to collapse. It is a method of resting the lung, and is comparable to fixing a splint in order to rest a tuberculous joint. The chief indication for inducing a pneumothorax is when the lung needs more rest than can be given by other means. The chief contra-indication is when both lungs are so actively or extensively involved that one lung is unable to carry on the function of the body if the other is collapsed. The lung needs more rest if in spite of treatment the disease spreads, fails to subside, or if the temperature and symptoms persist. Artificial pneumothorax may also be induced in tuberculous cases to check haemoptysis, to relieve the

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pain of pleurisy, or to control some symptom such as cough or excessive sputum. In a successful case of pneumothorax, sputum ceases or is much diminished and tubercle bacilli frequently disappear. The patient therefore is far less dangerous to others. The treatment usually has to be continued for two or more years, and, although during the later stages the patient is able to do a full day's work in many cases, the repeated refills are a trouble both to him and the doctors. Moreover, there are still towns where the treatment is not practised, so that the patient may have to go many miles to get a refill.

If the treatment is to be successful the greatest care must be taken with refills, for everything depends on giving the right quantity of gas at the right intervals. The amount of gas required and the frequency with which it is given varies enormously in different individuals. The nature of the gas given is not a matter of very great importance. Whatever gas is used it soon becomes converted in the pleural cavity into the same constituents as in alveolar air. If therefore ordinary air is used to induce a pneumothorax, one is using the most natural gas. Nitrogen is said to be absorbed more slowly, but in my experience the difference in the rate of absorption of air and nitrogen is negligible. Helium has been used in America as being an inert gas. Carbon dioxide is said to be readily absorbed by the serum of the blood, so that if any gets into the blood-stream accidentally it is not likely to cause gas embolism. Oxygen is used for a similar reason, being readily absorbed. Some physicians give a small quantity of oxygen first, then use nitrogen, and they claim by this method to avoid the danger of gas embolism. There should, however, be no fear of embolism if the pneumothorax is carefully induced, and the readings of the manometer are studied. Oxygen is more quickly absorbed than

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nitrogen or air, so that if one wishes the gas to be absorbed quickly—for example, in replacing pleural effusion—oxygen is the best gas to use.

In a straightforward case I usually start by giving 300 c.cm. of air. This allows a slight degree of collapse, and the next day I give a refill. At the end of about a fortnight I like the lung to be fully collapsed. The following may be taken as the average quantity of gas and intrapleural pressures in the first fortnight :

			Pressure before refill.	C.cm. of air.	Pressure after refill.
June 1	-16 -7	300	-14 -6
„ 2	-16 -7	300	-12 -4
„ 4	-14 -4	400	- 8 -2
„ 7	-10 -4	400	- 6 -0
„ 10	- 7 -2	400	- 4 -0
„ 13	- 7 -2	400	- 4 -0
„ 16	- 6 -1	400	- 3 +1

After this it is usually possible to extend the intervals between the refills to seven days, and later to a fortnight, three weeks, or a month. In some cases, however, the air is so quickly absorbed that refills have to be given twice weekly for many months. Of course the intrapleural pressure is very much affected by adhesions, the mobility of the mediastinum, the ability of the lung to collapse, and the above table is only a type in an uncomplicated case.

When the lung is sufficiently collapsed, it should be kept in the optimum degree of collapse, i.e. sufficiently to make the patient free from symptoms or as nearly free as possible, and yet not over-collapsed so that the function of the other lung is impaired.

It is very useful at this stage to have an X-ray examination so that the exact degree of collapse can be seen. By repeated screening one can see the lung beginning to re-expand after a few days, and as the lung expands the symptoms begin to return. Now, if it is found that a pressure of -4 +1 is not too great and yet is sufficient to keep the symptoms in abeyance,

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one should reach these pressures when giving a refill. If in this case symptoms returned and the lung began to re-expand when the pressures fell to -10 -5, a refill should be given before the pressure has fallen so low. Supposing it takes sixteen days for the intrapleural pressure to fall from -4 +1 to -10 -5, and it took 500 c.cm. of air to raise the pressures from -10 -5 to -4 +1, then it follows that in this particular case and in that stage of the treatment a refill of 500 c.cm. should be given every fourteen or fifteen days.

The length of time that the lung should be kept collapsed varies in different cases. In an average uncomplicated case some two or three years is the usual duration of the treatment, but during the later part of the time the patient is usually able to lead a fairly normal life. One of my patients was a policeman who used to have a refill in the morning and go on duty in the afternoon. Another used to come to London for a day's shopping, have a refill at 5.30 p.m., and return home with her husband after his day's work in the City. Patients feel so well and safe whilst under the treatment that they often want to continue it indefinitely. I saw one woman in Denmark who had had refills for fourteen years. I think it is hardly ever necessary to keep the lung collapsed for more than three years, but if the treatment is prolonged beyond this time it does not seem to be harmful. I have never known a case where the lung has not eventually re-expanded, except when there has been a spontaneous pneumothorax with an open perforation in the visceral pleura or in some cases with tuberculous empyema. In an ordinary uncomplicated case of artificial pneumothorax there is always some slight degree of re-expansion between the refills, and when the refills have been stopped the lung will eventually expand completely, though I have known it take nine months to do so.

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described this as obliterative pneumothorax, and when once the process of obliteration has begun it cannot be stopped by frequent refills or by keeping up a high intrapleural pressure. This termination of pneumothorax by adhesion and gradual obliteration often gives very good results, the patient remaining well with satisfactory fibrosis of the diseased part. If, however, one wishes to keep up the pneumothorax one must prevent the re-expansion of the base of the lung, and to do this it is necessary to remove the fluid and replace it with air at regular intervals, watching the lung from time to time under the X-ray screen and giving a refill whenever necessary to prevent the lung from coming in contact with the chest wall.

If artificial pneumothorax is carefully induced and kept up the dangers of the treatment are very slight. Dr. de C. Woodcock said in 1915 (*Edinburgh Medical Journal*, 1915, p. 314) : "There are dangers in connection with the production of artificial pneumothorax, but the greatest—and about this let there be no mistake—is the neglect in which it is held." This remark remains true today, except that the dangers now are still less than they were in 1915.

A fatal pleural shock may occur when the needle reaches the pleura in sensitive people, and it is doubtful whether anything can be done to prevent it. But it is extremely rare: I have had one case out of over 12,000 punctures in my series of cases. Non-fatal shock may occur and the patient may faint, become pulseless, and even appear to be dying, but recovery is usually a matter of a few minutes only. These cases are also rare.

Gas embolism used to be a dreaded complication. Air got into the blood-stream and caused cerebral embolism, creating paralysis and even proving fatal. With modern technique this can be prevented, and now it is practically unknown as a complication. The most

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thorax is a very safe and satisfactory method of treatment. In some cases, however, owing to areas of adherent pleura, it is not possible to obtain more than a very partial collapse of lung or sometimes any collapse at all. Even if a fairly complete collapse is obtained one may find that a cavity or diseased portion of the lung is held up by an adhesion, so that the patient continues to have a cough and sputum. In rare cases it is possible to cauterize these adhesions and so allow the complete collapse of the lung, but usually the visceral pleura with lung tissue is in close contact with the chest wall over the uncollapsed area, so that division of a few adhesions still leaves patches of adherent pleura which cannot be separated.

The formation of an effusion is a common complication. In the majority of cases a little fluid forms at some time during the treatment. This usually is quickly reabsorbed and does no harm. In some 40 per cent. of the cases the fluid remains for several weeks, and there may be a considerable quantity of it. In my series of cases, the ultimate prognosis was hardly affected by the formation of fluid: those patients who developed an effusion doing slightly better than those who did not. The management of a case when there is an effusion is quite different from that of an uncomplicated case, and where there is fluid the lung does not re-expand so readily, so that if the refills are continued as before the fluid developed a high intrapleural pressure will be reached and the mediastinum will be pushed to the opposite side which will interfere with the action of the better lung. A much longer interval can be left between refills when there is fluid, but if too long an interval is left there is a tendency for the lower portion of the lung to re-expand and become firmly attached to the chest wall. When this happens the adherence to the chest wall gradually spreads upwards, so that eventually the pneumothorax cavity is closed up. I have

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Gas embolism used to be a dreaded complication. Air got into the blood-stream and caused cerebral embolism, creating paralysis and even proving fatal. With modern technique this can be prevented, and now it is practically unknown as a complication. The most

serious complication is rupture of the visceral pleura, that is to say, a spontaneous pneumothorax complicating an artificial one. When this happens the patient usually becomes very ill with a high temperature, fluid forms, and generally turns into tuberculous pus, and a fatal issue is often not long delayed. Recovery may, however, take place even in those who have been desperately ill for several weeks.

If we regard artificial pneumothorax as a means of resting a diseased lung it follows that when both lungs are affected pneumothorax on one side will leave the other lung untreated. In other words, we are treating only part of the diseased tissue. It is possible to induce a partial pneumothorax on both sides at the same time, or to make one first on one side and then on the other. Good results have been obtained by these means, but it is obvious that the patient does not have the same chance as in a unilateral case. It may be compared to a case where both knees are tuberculous and a splint is put first on one and then on the other, or a splint allowing a good deal of movement is put on them both. In a case of bilateral disease, therefore, one can treat one lung efficiently and the other not at all, or one must be content to give both lungs partial treatment. It is in such cases that an alternative method of dealing with the untreated lung would be so useful, and recently good results have been obtained by the use of sanocrysin.

Sanocrysin.—This is a preparation of gold made by Professor M. Möllgaard in Denmark. Its mode of action is uncertain, but it would appear not to kill tubercle bacilli in the test-tube. Its action in the body is possibly due to stimulation of some unknown elements and so reacting on the tubercle bacilli. In animal experiments there can be no doubt that it does have a very real effect on the tuberculous lesion, and in human beings it certainly tends in many cases to rid the sputum

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of tubercle bacilli and to reduce the quantity of sputum. Sanocrysin must not, of course, be regarded as a specific or cure for tuberculosis, but I have used it now for over two years and have found it to have quite a definite effect on the disease in many cases. It is a dangerous drug if given carelessly, and may produce serious or fatal metal poisoning. With care, however, it is harmless, although one sometimes sees temporary attacks of stomatitis, diarrhoea, albuminuria or rash, and one must remember that, as with most drugs, some people are very much more sensitive than others to its effects.

There are two types of case for which sanocrysin is especially useful. One is the acute bilateral case, where the worse lung can be treated by pneumothorax, and sanocrysin may check the spread of disease in the other. The other type is when sputum and tubercle bacilli persist in the sputum in spite of prolonged treatment and improvement in other respects. I have known many cases where the sputum has dried up after three or four injections of sanocrysin. In one case of chronic disease the patient had for sixteen years about an ounce of sputum loaded with tubercle bacilli. After four weeks of sanocrysin treatment the tubercle bacilli disappeared, he had three negative sputum tests, and then no sputum at all. This, however, was an exceptional case, for usually in chronic fibroid cases sanocrysin has little or no effect. It is certainly worth trying, however, in any case where tubercle bacilli are persistently present in the sputum. It is too early to speak of the ultimate results of sanocrysin, and it is true that in most cases there is a relapse and tubercle bacilli reappear in the sputum when the sanocrysin injections are discontinued, so that it may be necessary to give two or more courses of treatment.

In cases of poisoning by sanocrysin, sodium thiosulphate (gr. 10 in 5 c.cm. of water) should be given

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intravenously, and this usually works like a charm. If some of the sanocrysin solution is spilt outside the vein a local and painful swelling will develop; 5 c.cm. of the sodium thiosulphate solution injected subcutaneously into this swelling generally causes it to subside.

Serum.—I have recently been using some serum prepared by Captain S. R. Douglas from a horse previously treated with Professor Dreyer's diaplyte tuberculin. It is chiefly of value in cases where there is continued fever or great toxæmia. There is generally a reaction, but it often has no effect on the progress of the disease. Sometimes, however, it does relieve the toxæmia and level the temperature and allow one to proceed with sanocrysin or some other treatment. I have had several cases with acute and rapidly-spreading disease that have become afebrile and steadily improved after reactions following the injection of the serum.

When sanocrysin was first used an anti-tuberculous serum was frequently given to counteract the reactions caused by the sanocrysin. It was thought that the gold killed a large number of tubercle bacilli and so set free a quantity of toxins which could be neutralized by the serum. Nowadays severe reactions in sanocrysin treatment are prevented by avoiding too large doses, and by allowing a sufficient interval between the injections, so that the effect of one dose has worn off before another is given.

Serum must be injected slowly, and one should start with small doses, such as 5 c.cm., and the dose can then be increased by 5 or 10 c.cm. at three-day intervals. I have seen very severe reactions follow the injection of serum, and it must be employed with the greatest caution in the case of patients who are very weak or ill.

CONCLUSIONS.

Success in the management and treatment of a case

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of pulmonary tuberculosis depends on careful attention to detail, always remembering that there is no one cure and that the disease goes through many changes, so that what is good treatment in one stage may be actually harmful in another. In addition to general treatment there are various methods which may be considered as aids to cure. Three of these methods, namely, artificial pneumothorax, sanocrysin and serum have been considered in this article.

(1) *Artificial pneumothorax*.—This is a means of giving rest to the diseased lung. The dangers associated with the treatment are very small; the advantages are many. Amongst the advantages one must emphasize the facts that by preventing expectoration the patient is much less likely to infect himself or others, and, secondly, if a patient has to work for his living before the disease is arrested, he can do so with much more safety if the diseased lung is in a state of collapse.

(2) *Sanocrysin*.—In the majority of cases a course of injections of this drug will reduce the quantity of sputum and free it from tubercle bacilli. It is very useful in bilateral cases, often in conjunction with artificial pneumothorax, and even in the most chronic cases it will sometimes get rid of the tubercle bacilli.

(3) *Serum*.—This will sometimes level a tuberculous temperature or relieve toxæmia. It is useful in trying to render a toxic patient afebrile and fit for sanatorium or other treatment.

There are many other special methods of treatment. The surgical procedures of thoracoplasty or phrenic evulsion are often most helpful. Tuberculin, calcium and other remedies all have their value. Because in this article I have selected only three out of many weapons which may be used against tuberculosis, it must not be supposed that I fail to appreciate that other methods have their place in the treatment of the disease.

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mouse, together with a small amount of washed culture of *B. welchii*, or of streptococci, a virulent infection takes place, and in the case of gas gangrene is rapidly fatal. The same phenomenon occurs when the inoculation is given 24 hours after the injection of calcium chloride. To this the name of "defense rupture" has been given. It does not occur for these specific organisms when the trauma is produced by other agents than calcium, e.g., turpentine, although the turpentine lesion appears to be more severe and extensive than that produced by calcium chloride. It may be that the calcium acts like a "chemical manure," increasing enormously the growth and development of these particular organisms. Other interesting experiments by Dr. Gye and Professor Kettle have shown the intimate relationship between silica and the tubercle bacillus.

When mice or rabbits are inoculated with the tubercle bacillus there is very little tissue reaction, but when silica is also introduced subcutaneously the bacilli proliferate abundantly in the necrotic area induced by the silica. When lesions were set up in one flank by silica, and in the other by other agents, such as calcium chloride or turpentine, and tubercle bacilli inoculated intravenously, the silica lesion showed a profuse growth of tubercle bacilli and the other lesion very slight growth, in spite of the fact that the necrosis was much more extensive. This, of course, has an important bearing on the subject of miners' phthisis, and would indicate the advantage of an Alpine winter climate in the treatment of tuberculous lung disease, rather than that of Egypt or the North African desert, where sand storms are of frequent occurrence.

That trauma from strain or injury is a frequent factor in the development of local tubercle of bone or joint in the human subject, I have no doubt. I have

The Relation of Infection to Trauma, and its Treatment.

By HERBERT H. BROWN, O.B.E., M.D., F.R.C.S.

Consulting Surgeon to the East Suffolk Hospital, etc.

THE relation of infection to trauma is a very intimate one and has an important bearing on surgical treatment—a bearing which I think does not always receive the attention it deserves. Many years ago, in my student days, when bacteriology was in its infancy, I can remember Mr. Marcus Beck—one of the pioneers of modern surgery—telling us, in discussing a case of acute osteomyelitis, that the disease was caused by the *Staphylococcus pyogenes aureus*; but, he explained, if the staphylococcus is injected into the circulation of a rabbit it does not produce osteomyelitis unless one of the bones is bruised, but if this is done the disease invariably follows. The bruised and damaged tissues form a suitable nidus for the growth of the organisms which escape from the torn and injured vessels into this area.

In recent years some important experimental work has been done on the relation of chemical trauma to infection, especially by Drs. Bullock and Cramer, W. E. Gye and E. H. Kettle. Certain chemical reagents, e.g. calcium chloride, silica and turpentine, produce definite types of lesion, which differ according to the agent used, and may have a specific relation to microbic infections. Animals, such as mice or rabbits, are normally resistant to the organism of gas gangrene, or to streptococcal infections, but when 5 to 10 mg. of calcium chloride are injected under the skin of a

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There is another aspect of the relationship of trauma to infection which is of especial importance in the practice of surgery. It may happen that an infection at first localized becomes general, infecting blood-stream or distant regions of the body, and not infrequently ending fatally. This may be due to a diminished resistance on the part of the patient, or to trauma from accidental injury to, or surgical interference with, the infected area. Vaccine therapy during an acute infection is not free from danger; too large a dose may lower the tissue resistance sufficiently to lead to an acute infection. No doubt this is fairly well recognized, and more caution is used in dosage than was formerly the case. But the danger which may accompany surgical interference with the site of infection is, I am sure, not always sufficiently recognized. Years ago surgeons used to talk of the "ripening" of an abscess, and it was an axiom that an indurated inflammatory area should not be incised until the "abscess had ripened," by which it was understood that the tissue was softening and becoming boggy, or that definite fluctuation could be felt. When this stage was reached the abscess was incised, "laudable pus" escaped, and the wound progressed satisfactorily as a rule.

This practice, the result of experience, rests upon a sound scientific basis of support, although at that time not manifest. During the "ripening" of an inflamed area toxins are being absorbed into the

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followed within 24 hours by a sudden onset of profound septicæmia, very rapidly fatal. In this case a pure culture of the Klebs-Loesfler bacillus was obtained from the blood and pericardial fluid.

Of all acute infections, perhaps appendicitis is at the present day that which concerns the general surgeon most. It is in operating for this complaint that the dangers of traumatic infection should be especially kept in mind. It is, I think, generally recognized that the operation has a higher rate of mortality when performed from about the third to the sixth day after the onset of symptoms. During the first 24 hours the operation mortality is almost negligible, during the second day there is an increase in the mortality rate, which becomes much higher during the next few days, to fall very considerably after the first week. I refer especially to cases in which a localized abscess follows the appendix infection. Why should there be any mortality? The operation is an extremely simple one—merely to open an abscess and evacuate pus. There is practically no risk of infecting the general peritoneal cavity, and the condition of the patient at the time of operation is usually satisfactory, and yet a certain number die. In many such cases, especially in children, an identical train of symptoms precedes the fatal ending. For 24 hours, or perhaps longer, the patient appears to be making normal progress, then a sudden change appears, the child becomes pallid, restless, with a rapid increase in the pulse rate, the restlessness increases with perhaps short intervals of sleep, and a shrill "meningeal" cry is heard at times, delirium is followed by coma, and death within 24 hours, or little more, of the onset of these symptoms. Symptoms of this character appearing after operation for appendicitis have been attributed to delayed chloroform poisoning, meningitis or other causes. As a matter of fact they are due to

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circulation and antibodies produced, until considerable protection against tissue infection outside the suppurating area and immunity to blood infection has been set up. When the abscess is "ripe" the immunity has reached a relatively high degree; the inflamed tissues may be freely incised without danger of the infection spreading in the tissue or the blood becoming infected. If, on the other hand, the infected area is incised too soon, there is grave danger of infecting the blood and lymphatic stream with active and virulent organisms which, in the absence of sufficient antibodies, may run riot with disastrous results, and this is even more likely to happen if the infected tissue is roughly handled, curetted or crushed with forceps. In the earlier days of antiseptic surgery this principle was in danger of being disregarded. In cases of acute septic infection of the uterus after childbirth, it was the practice of some obstetricians to curette the infected endometrium in the hope of getting rid of the infected area. The result was an acute infection of the blood-stream and the fatal termination was expedited. Of course, such drastic procedure has been long abandoned ; I suppose everyone at the present time realizes that to interfere with an infected puerperal endometrium is an extremely dangerous procedure.

The removal of septic tonsils, more particularly by the modern method of enucleation, in which loose cellular tissue is opened up, is not free from risk. Fatal septicæmic infections have been known to occur. Care should be taken to avoid any such operation in the presence of active infection. I have also seen blood infection follow incision of a brawny indurated area in the neck at an early stage of a streptococcal infection, and even after curetting a non-puerperal uterus in which there was latent infection. I have seen the removal of a small portion of haemorrhoidal tissue, black and almost gangrenous from diphtheritic infection,

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TREATMENT OF ACUTE INFECTIONS.

There are three chief lines of treatment which are adopted :—

- (1) The use of antitoxic sera.
- (2) Vaccines, especially autogenous.
- (3) Intravenous injections of colloidal or other drugs.

Antitoxic sera are, of course, of proved value, and if the specific serum is employed early enough and in sufficient dosage it may cut short an acute attack. No one would attempt to treat diphtheria without antitoxin; but in many cases, especially of severe infections, the response is inadequate. Then there is the danger of anaphylactic shock. In these days, when sera are freely used, it must often happen that a serum is indicated in a case when the patient has received injections, perhaps for some other disease, months or even years, previously. In such cases even a moderate dose may produce severe, dangerous or even fatal shock. In cases of blood infection following operation for appendicitis I have not found sera of any avail, even when specially prepared from cultures of *B. coli* and *Streptococcus fecalis* derived from cases of appendicitis.

Vaccines are still employed in combating infection; but while the value of autogenous vaccines are undoubtedly great in prophylaxis, they are far less useful when an acute infection is in progress, and they have special dangers. The dosage is not easily fixed, and if

an acute blood infection by the organism responsible for the appendicitis, the infection taking place at the time of operation. In the last six cases which I have seen in which this syndrome appeared, I took a blood culture from the basilic vein—in every case there was a free growth of the *Streptococcus fecælis*, or of the *Bacillus coli*, or of both. During an acute attack of appendicitis the lethal organisms invade first the mucous membrane of the appendix and then the submucous tissue and muscular wall, in which they proliferate freely, causing an acute inflammatory œdema and eventually local necrosis. Toxins and subsequently organisms pass out into the surrounding peritoneal space, causing an inflammatory reaction in the omentum or peritoneal surfaces of bowel in the immediate neighbourhood, producing a local abscess, with walls surrounded by a layer of lymph which limits the infected area. This wall of lymph acts like a filter, keeping back the organisms, but allowing toxins to soak through into the lymphatic system and blood-stream, and thus gradually to produce general systemic immunity. Should the invaded inflamed area of the appendix be crushed with forceps, or the protective lymph be removed by rough handling, before general immunity has been set up, an acute blood infection may result. It is for this reason that operations from the third to the sixth day after the commencement of the attack have a higher rate of mortality. The appendix should not be removed unless the infection is practically confined to the organ itself, except when there is already a general peritoneal infection, and care should be taken only to crush and cut through healthy, uninfected tissue. In dealing with an abscess care should be taken to avoid disturbing lymph by rough handling or instrumentation: the simple introduction of a drainage tube is all that is required.

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- (3) Intravenous injections of colloidal or other drugs.

Antitoxic sera are, of course, of proved value, and if the specific serum is employed early enough and in sufficient dosage it may cut short an acute attack. No one would attempt to treat diphtheria without anti-toxin; but in many cases, especially of severe infections, the response is inadequate. Then there is the danger of anaphylactic shock. In these days, when sera are freely used, it must often happen that a serum is indicated in a case when the patient has received injections, perhaps for some other disease, months or even years, previously. In such cases even a moderate dose may produce severe, dangerous or even fatal shock. In cases of blood infection following operation for appendicitis I have not found sera of any avail, even when specially prepared from cultures of *B. coli* and *Streptococcus fecalis* derived from cases of appendicitis.

Vaccines are still employed in combating infection; but while the value of autogenous vaccines are undoubtedly great in prophylaxis, they are far less useful when an acute infection is in progress, and they have special dangers. The dosage is not easily fix-

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too large a dose is given the infection may be very seriously aggravated.

In intravenous medication with colloidal or various synthetic products we have a very valuable resource which is becoming explored. Streptococcal blood infections, such as puerperal septicæmia, in which serum has failed, often respond favourably to injections with colloidal silver, about 20 c.cm. being given intravenously every two or three days. I am sure that many lives have thus been saved. I have seen a case of blood infection with *Staphylococcus aureus* and pneumococcus following on a post-operative peritonitis, in which the blood was eventually completely sterilized by repeated intravenous injections of colloidal silver, and the patient was restored to health. Mercurochrome is another drug which, when given intravenously, will sometimes produce almost miraculous results in cases of severe infection. It is, I think, especially valuable in cases of *Bacillus coli* infection, e.g. serious infection following appendicitis, pyelitis, etc. In several cases in my own experience of *B. coli* renal infection, the urine has been completely and permanently sterilized after one or more injections. Mercurochrome is a somewhat dangerous drug, and great care must be used in its administration. The accepted dose is 5 mg. to 1 kilogram of the body-weight, and 20 c.cm. of 1 per cent. solution is a usual amount to inject into the vein of an adult at one dose. But some people have an idiosyncrasy to mercury, and severe symptoms of mercurialism, vomiting, colitis, etc, may supervene; a slight degree of stomatitis is not uncommon as a sequela. It is better, except in the most desperate cases, to feel one's way first with a much smaller dose. In cases of staphylococcal septicæmia, intravenous injections of gentian violet have been given with success; and certainly, in less severe infections, stannoxyd has proved of great value.

Common Urinary Tract Diseases which Give Difficulty in Diagnosis.

BY H. P. WINSBURY WHITE, F.R.C.S.

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HERE are two special reasons why there may be difficulty in recognizing the upper urinary tract as the principal seat of disease. One, that there are frequently no localizing clinical features in this region, and the other, that the symptoms are often entirely referable to the bladder. The most striking and convincing illustration of these facts exists in connection with renal tuberculosis. In more than 90 per cent. of cases the disease gives rise to painful and frequent micturition, as often as not unaccompanied by any local kidney signs either subjective or objective. While as a striking contrast in a very small proportion of cases the patient has no knowledge of any but the most recent symptoms, in relation to either kidney or bladder, and yet when the renal organ is exposed by operation it is found that all its excreting tissue has been destroyed by tuberculosis, a state of affairs only to be explained by long-standing ulceration. I refer to certain cases of "closed renal tuberculosis."

It must be clear from these extreme examples that the simpler and less destructive types of renal infection can exist in the same unobtrusive way. This, indeed, is a fact frequently observed by those who are constantly investigating urinary cases. It is therefore to be expected that the existence of a chronic infection

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with stone and that most cases of stone do not give rise to colic. Only one-third of a total of 58 cases of renal or ureteric stone which the writer has been able to investigate personally, suffered with this symptom. The understanding of the possible causes of colic will save us often from a precipitate and wrong diagnosis. Perhaps few of us have missed the experience of being called to a patient suffering from renal colic, and of making up our minds at once that it is a typical case of stone, which conclusion, however, is not substantiated by a subsequent X-ray. A radiogram negative to stone in such a case is a surprising but useful experience for it establishes the fact that stone is not the only cause of renal colic. Spasm of the renal pelvis or the ureter is the immediate cause of colic, while the condition leading up to this is often mechanical obstruction. Proof is wanting, however, that the last-mentioned factor is essential. Stricture of the ureter and intermittent hydronephrosis, both of which are now frequently recognized as successive stages in a chronic inflammatory process which has commenced in the kidney and involved the ureter, are frequently associated with colic, attacks of which are doubtless precipitated by a flare-up of the lingering infection. Except for the grosser examples of hydronephrosis these conditions can only be diagnosed by ureteric catheterization which often has to be followed by uretero-pyelography.

A simple pyelitis (pyelonephritis) is frequently responsible for colic. Spasm of a hollow viscus, the seat of acute inflammation, is a sufficiently commonplace phenomenon not to require any excuse for bringing it forward as an accompaniment of pyelitis.

Hæmaturia.—The cause of blood in the urine is so frequently in doubt that it would be out of place not to give the subject some attention. The investigation of hæmaturia offers two separate problems, first as to

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often continued over a period of many years, will ultimately lead to permanent changes in the kidney and ureter which in themselves will give rise to a fresh train of symptoms in due course. Chronic interstitial nephritis, stricture of the ureter, and intermittent hydronephrosis are the more important of these after-effects.

Renal Pain.—When pain occurs in the kidney it is due either to obstruction to the escape of urine into the ureter or to congestion of the renal substance. Both of these conditions can be precipitated by infection. In the walls of some ureters, there are certain narrowings, congenital or otherwise. Swelling of the mucosa in the vicinity of these constrictions is inevitable with a certain degree of infection, and is all that is necessary to cause obstruction. These constrictions are often best demonstrated by artificial means. They were described and illustrated by me in a Hunterian Lecture published in the *British Journal of Surgery*, October, 1925.

The pain of renal congestion which may or may not be accompanied by blocking of the ureter, is due to excessive tension of the true capsule caused by the engorgement of the parenchyma. On the other hand, a mild degree of infection in an unconstricted ureter does not give any local kidney signs. The following clinical types must therefore be kept in mind as they are frequently found on investigation to be due primarily to an infection seated in one or both kidneys:

Chronic frequency of micturition without renal pain.
Recurring frequency of micturition without renal pain.
Certain cases of general ill-health without urinary symptoms.

Certain cases of painless haematuria.

Renal Colic.—There is perhaps no symptom of urinary tract disorder more frequently the subject of misinterpretation than renal colic, which therefore requires careful consideration. Of first importance are the facts that most cases of renal colic are not associated

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with stone and that most cases of stone do not give rise to colic. Only one-third of a total of 58 cases of renal or ureteric stone which the writer has been able to investigate personally, suffered with this symptom. The understanding of the possible causes of colic will save us often from a precipitate and wrong diagnosis. Perhaps few of us have missed the experience of being called to a patient suffering from renal colic, and of making up our minds at once that it is a typical case of stone, which conclusion, however, is not substantiated by a subsequent X-ray. A radiogram negative to stone in such a case is a surprising but useful experience for it establishes the fact that stone is not the only cause of renal colic. Spasm of the renal pelvis or the ureter is the immediate cause of colic, while the condition leading up to this is often mechanical obstruction. Proof is wanting, however, that the last-mentioned factor is essential. Stricture of the ureter and intermittent hydronephrosis, both of which are now frequently recognized as successive stages in a chronic inflammatory process which has commenced in the kidney and involved the ureter, are frequently associated with colic, attacks of which are doubtless precipitated by a flare-up of the lingering infection. Except for the grosser examples of hydronephrosis these conditions can only be diagnosed by ureteric catheterization which often has to be followed by uretero-pyelography.

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Hæmaturia.—The cause of blood in the urine is so frequently in doubt that it would be out of place not to give the subject some attention. The investigation of hæmaturia offers two separate problems, first as to

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its source and second as to its cause. The former can, as a rule, only be determined by a cystoscopy, and if the bleeding is of renal origin, it is essential that this investigation be made before the blood disappears, otherwise inspection of the interior of the bladder may fail to add any positive evidence, and exhaustive examination by other means may also fail to prove its source. When accompanied by pain, haematuria is generally sufficiently alarming to cause the patient to seek a full investigation; but with the painless type, especially if the bleeding is not very copious or prolonged, blood may be absent from the urine for months or even years without leaving any disturbing symptom. The patient may thus be led to feel that the cause, whatever it was, also disappeared when the bleeding stopped. It is not an uncommon experience in one's out-patient department to find that a case has come for investigation of haematuria which has ceased several days before, the patient having remained in bed while the bleeding was on. A malignant change taking place in a simple growth is a danger which is always likely when delay is prolonged. From time to time one meets with cases of carcinoma of the bladder with a history of painless haematuria extending over years, indicating that for a long period the growth had non-malignant characters.

Quite a considerable proportion of cases of haematuria owe their bleeding to an infection of some part of the urinary tract, and when the focus is in the kidney the infection with its resulting bleeding is more often than not due to a manifestation of some pre-existing pathology, such as stricture of the ureter, stone, or intermittent hydronephrosis. Essential haematuria is a term which occupies but a small place in the category of diseases of the skilled urologist. It has its widest use with clinicians who have failed to keep pace with the times in not recognizing the fact that most cases

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of haematuria, if investigated promptly and by approved methods, can be assigned a definite cause.

Renal Calculus.—After having discussed renal pain, colic and haematuria, it is fitting that some reference should be made to renal calculus, as these are frequently referred to as its cardinal symptoms. My personal investigation of 58 cases of renal or ureteric stone is that it is exceptional to find these symptoms all in the one case. Pain is the commonest cause by far, which sends the patient with stone to seek the doctor's advice. But in many cases the stone exists for long periods without the slightest discomfort. This fact becomes apparent when one considers the short history given by some patients with very large renal stone. In these the ultimate onset of pain is generally determined by a marked increase of infection. I recently removed the left kidney of a woman aged 66, whose first experience of pain was not until a large perinephric abscess developed. The kidney on removal was no larger than a hen's egg and consisted of but a shell of renal tissue containing numerous stones, obviously a diseased condition of many years' standing. Renal colic, contrary to general belief, is an inconspicuous feature in most cases of calculus. It was noted in 33 per cent. of the 58 cases already referred to. Blood in the urine can be demonstrated in something like 80 per cent. of renal stone cases if chemical or microscopical tests are employed, but the proportion of patients who can tell their medical practitioner that they have noted blood in the water is extremely small.

Pus and bacteria are commonly found in the urine of renal stone cases. One or both of these elements were noted in 86 per cent. of 36 cases of which I investigated the bacteriology. One should always guard against the inclination to accept the mere identification of bacteria as having established the diagnosis. As colon bacilluria is frequently referred to as though it

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without anaesthesia. The ultimate result to the urinary tract in these neglected cases is a severe chronic infection of the bladder with bacillus coli and other organisms. One gross case that I recently dealt with had been regarded and treated for many years as one of chronic bacillus colic infection without any inquiry as to why such an infection should be present. A large proportion of the so-called senile cystitis cases in women owe their origin to a chronic urethritis and respond in a most gratifying way to the proper treatment. In some of the more chronic cases of gonorrhœal urethritis in the female, there may be little or no outward sign to suggest the real cause, which should therefore be kept in mind, especially in a case of acute onset of frequency which shows signs of becoming chronic.

What is the cause of these chronic urethral infections in women? Many of them, especially those leading to stricture, undoubtedly owe their origin to a gonococcal infection in the past. In some of these the urethral condition is kept up by a persisting mixed infection in Skene's glands, which have their orifices either internal or external to the external urinary meatus. Others originate in the genital tract, the majority from the uterus, some from the vagina, in which latter situation contraceptives and other objects frequently introduced are to be suspected. Armed with the foregoing knowledge of the etiology of bladder trouble in women, investigation directed towards eliminating first one cause and then another is bound to lead to a satisfactory result. Sometimes an attack of cystitis will overtake a female patient with surprising suddenness, cause very acute symptoms for a few days, and then clear up completely. Unless the case is investigated promptly, both examination of the urine and endoscopy may fail to show a definite cause.

In men, chronic or recurring cystitis originating in the urethra or genital tract, although not so common

were a primary disease, and as coliform bacilli are by far the most common type of bacteria found with stone, there is some danger that cases with slight or vague symptoms may go undiagnosed.

The Lower Urinary Tract.—In many cases of cystitis the bladder symptoms are but an indication of infection seated at a higher level. In women more especially, chronic or recurring frequency of micturition are among the commonest disorders that the urologist has to investigate, and are the most difficult to treat successfully if the cause is not sought in the proper way. Some are quite simply dealt with by an anterior colporrhaphy or the smaller repair operation which restores the stretched vesical fascia. This latter accident of parturition troubles the patient with frequency of micturition and incontinence of urine on exertion and the cause of the symptoms is frequently unrecognized.

But after excluding these and those of renal origin, there is still a group of cases many of whom are single or nulliparous women. The urethra is most commonly the seat of their trouble. Here there is often to be found a chronic inflammatory condition which, although it may give rise to no discharge, is very obvious with the urethroscope and is sometimes accompanied by characteristic changes at the external urinary meatus. Urethral caruncle is one of the gross manifestations of the condition, yet how often does one find that it is looked upon and treated as an independent pathological condition. In a considerable number of these cases there is an actual urethral stricture. It is a common belief that stricture is rare in women. This is the direct opposite of the truth. It is quite common. I have a large number of women patients attending me regularly for intermittent dilatation, and the benefit to these cases is manifested in the regularity of their attendances. I have seen several urethral strictures in women quite impermeable to a filiform bougie

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In men, chronic or recurring cystitis originating in the urethra or genital tract, although not so common

as in women, may be equally puzzling. Well-marked strictures in the urethra are easy enough to detect, but when one of these is not discovered, the urethroscope will often disclose commencing stricture and follicles with contracted orifices which are obviously the seat of chronic inflammation. Such foci can only be detected by urethroscopy. A rectal examination of the prostate and seminal vesicles will often identify at once inflammatory thickenings in these organs. This means, however, sometimes fails to reveal the presence of a low-grade inflammation, for the posterior urethroscope has taught us that the prostate can be the seat of an infection without any palpable changes per rectum. In the same way an examination of the urine after a prostatic massage may fail to disclose a latent infection.

In the male as in the female, a subsiding gonorrhœal urethritis which has lost all outward signs of the disease will be found to be the explanation in some cases where the real cause is quite unsuspected. The simple rule of the two glass test will generally keep one on the right track. A puzzling type of case is one in which the patient gets a sudden attack of colic-like pain located deeply in the pelvis and referred to one or other groin and often into the scrotum. There is some excuse for thinking such a case is one of stone in the ureter, especially if accompanied by hæmaturia, whereas it is really due to a lighting up of an infection in the prostate or one of the seminal vesicles.

Extra-Urinary Foci of Infection.—These are important causes of urinary tract infection in certain cases. I have had experience of some striking and gratifying results by bearing this fact in mind. Gastro-intestinal derangement especially with regard to constipation is of first importance. Careous teeth when present must always command attention, and the genital tract as a focus of infection for the kidneys as well as

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for the bladder must not be forgotten.

Type of Infecting Organism.—Apart from the tubercle bacillus, the nature of the infecting organism is not as a rule of great moment. The outcome of discovering bacteria in the urine should be that a full investigation of the patient is made as to why the urinary tract is infected; for infection as a rule indicates some pre-existing pathological condition. *B. coli* is no exception to this rule, and is found complicating all the well-known diseased conditions of the urinary tract.

Stone in the Bladder.—This offers two special difficulties in regard to diagnosis. Although there may be every reason to suspect the presence of a stone, a careful search with the sound may fail to reveal the familiar click, if the former is very small. Again, on X-raying certain cases who are suspected strongly of having vesical calculus, one may be surprised to see no evidence of this on the radiogram. It should be remembered that a stone may nevertheless be present, if it is composed largely of uric acid or urate. It is running a considerable risk in either case in not completing the examination with a cystoscopy.

Difficulty with Micturition.—Certain cases suffering from difficulty, who are easily shown not to be suffering from urethral stricture, by the passage of a large sound, or from prostatic enlargement by rectal examination, are sometimes somewhat puzzling. Do not forget to examine the nervous system. Evidence of tabes may be at once forthcoming, or even if it is not, this possible cause should be pursued by special investigation, because bladder symptoms not infrequently make their appearance before the usual changes in the patellar and pupillary reflexes. The symptoms may be accounted for by prostatic changes which are not palpable on rectal examination but which can be discovered by cystoscopy or urethroscopy.

Renal Swelling without pre-existing Symptoms.—The

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unannounced appearance of a swelling in the renal region may be the first indication of kidney trouble that the patient has. This may result in a visible bulging in the loin and is then usually an indication of a perinephric collection of fluid which has escaped from the kidney, which is usually in an advanced stage of disease when this complication occurs, and is another reminder of the insidious way that inflammatory disease of the kidney may advance. Two recent cases that came under my notice are worth mentioning:—

A male, aged 20, who had never suffered from any urinary symptom or from pain in the loin suddenly became aware of a bulging of his right side. Cystoscopy revealed a functionless right kidney with an obstructed ureter, a radiogram, a calcareous mass in the renal region; and operation, a collection of perinephric fluid and a kidney whose substance had been completely destroyed by tuberculosis and replaced by calcified material.

The other was the patient aged 66, referred to under *Renal Calculus*, who developed a bulging in the left loin. Incision provided an escape for a considerable quantity of pus, and X-rays showed a large number of stones in the left kidney. The patient had passed stones more than 30 years before, but had had no local or urinary signs of stone since, until the swelling appeared.

I have confined my remarks as much as possible to problems and difficulties in diagnosis of urinary disease which occur in general practice. The urologist in carrying out his special investigations has his own problems to solve. On the other hand, the majority of diseased conditions of the urinary tract are perfectly easy to discover in the course of a routine examination, during which the X-rays, cystoscope and ureteric catheters are employed, and diagnosis can be made so certain by one or more of these means that it is always wise to take advantage of them.

Observations on the Significance of Low Arterial Pressures.

By A. GRAHAM-STEWART, M.B., CH.B.

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LOW blood-pressure has not shared in the lime-light of the reverse condition. Yet this state seems to be regarded as one of somewhat sinister omen, a herald of lurking danger, and as carrying a sense of the unknown. Sir Thomas Lewis suggested to me a good many years ago that some observations on this state, some facts regarding the prognosis, and whether or not the state is one of evil omen, would be of use. This article in THE PRACTITIONER is, then, a summary of observations on some very definite cases.

Martinet, of Paris, in his excellent work, "Clinical Diagnosis," regards the state as "often one of marked clinical significance." Regarding disorders causing cahexia, he looks upon progressive and inveterate low blood-pressure as generally a forerunner of death—a fact now well established as, for example, a rapidly deteriorating case of pulmonary tuberculosis. This is one of the most constant phenomena in such a case. Again there is the classical Addisonian syndrome, with low pressure, asthenia, pigmentary changes and vomiting, together with the very dubious Sergent's white line. There are, of course, lesser forms of this exhibiting merely low pressure and asthenia—hypoadrenia: a state only too common, liable to be overlooked, and very often chronic. Then, on a different basis, there is the low diastolic pressure of aortic

regurgitation; and similar low pressures are met with in grave cases of the idiopathic anaemias. Also, there is the low pressure of the "hyposphyxic syndrome" (Martinet) of young girls, sedentary individuals and, possibly, the pretuberculous. This syndrome, well described by Martinet, is identical with what the late Sir James MacKenzie termed his "X disease"; in his later years he stated that he had realized that his X disease and the symptoms and results of chronic intestinal stasis were one and the same thing. The state is characterized by low pressure, constipation, cyanotic extremities (the "blæ" type), livid skin, sensitivity to cold, weak pulse and a marked tendency to venous congestions, easy fatigue and nutritional changes. The symptoms of X disease (Sir James MacKenzie), chronic intestinal stasis (Sir Arbuthnot Lane) and hyposphyxia (Martinet) are almost identical. Martinet puts down his syndrome entirely to pluriglandular deficiency; perhaps today it might be more correct, and going a point further, to say that the syndrome of Martinet plus the pluriglandular deficiency are both secondary to chronic autoxæmia—the view held by the other two distinguished writers.

The psychoneurotic tend to run a continuous low pressure (they are frequently toxic individuals), so do the anaemic, and there is a group often running in families where there is a lack of tone in the cardiovascular functions with resulting hypotension. We are, of course, familiar enough with the low—and often dangerous—pressures following traumatic shock, prolonged anaesthesia, haemorrhage, etc. But this is generally temporary and belongs to a different group. The serious type I think we know something of; but the type I wish to discuss perhaps we know less of, namely: Given a patient, where we can exclude grave underlying states, who seems in good health generally, but whose pressure is exceedingly low, what signifi-

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cance has this hypotension; in what way is it going to affect the physical and mental well-being and vigour of that patient; does a sword hang over him (as often seems to be thought); is the patient a bad operative risk; is his future prognosis serious and his life likely to be materially shortened? An attempt to answer these questions can, perhaps, best be made by quoting some cases.

1. Some eight years ago I was consulted by the late Dr. Robert Thomson, of Margate, about a patient of his, a stout woman of 42, three months in her fifth pregnancy. She had been vomiting seriously for a very considerable time, could keep nothing down, the odour of acetone was pouring from her breath, and the urine contained much di-acetic acid. Pulse-rate, 80; blood-pressure, 75-65. The surgeon was anxious to empty the uterus, but in face of the blood-pressure—perhaps less understood then than now—was anxious about the giving of an anaesthetic. In the hope of improving the pressure we agreed to a preparation of two days. During this time she had many doses of pituitrin, plenty of strychnine, and everything else one could think of to raise pressure. At the end of the time the pressure was where we began—no response at all. I gave her open ether, the uterus was emptied, and she made an uneventful recovery, the pressure remaining just the same after operation and for a couple of years after, when I lost touch with the case. I do not know her pressure now, but I do know she is in good health, and has had a full-time child since. This patient was strong and active and complained of fatigue only.

2. In 1916 I was consulted by a patient I have had continuously under observation to this day. Age then 58, he complained of fluttering of the heart and easy fatigue. The heart was sound. Blood-pressure 95-75. Pulse regular, rate 68. A man of plenty of physical energy and enormous mental power and concentration, he ran successfully many and large financial concerns. He was too stout, and was the victim of chronic intestinal toxæmia. Two years ago, age then 67, a double antrum operation was done under chloroform anaesthesia. He made a perfect recovery without the slightest sign of shock or disturbance. The pulse never quickened and the blood-pressure remained the same. Five months ago, age then 69, a very difficult prostate was removed as he was getting varicose bleeding from the bladder and back-pressure on the kidneys. The same evening he was very fit, no post anaesthetic vomiting, bright and cheerful, and without a suspicion of shock or general systemic disturbance. Today he is vigorously directing the many strenuous affairs in which he is concerned, his mental powers and his power of concentration are as good now, just on 70, as they have ever been. Under active detoxicating treatment the blood-pressure of late has gone up to 130-80.

This case well exemplifies the following questions : (a) Operative

regurgitation; and similar low pressures are met with in grave cases of the idiopathic anaemias. Also, there is the low pressure of the "hyposphyxic syndrome" (Martinet) of young girls, sedentary individuals and, possibly, the pretuberculous. This syndrome, well described by Martinet, is identical with what the late Sir James MacKenzie termed his "X disease"; in his later years he stated that he had realized that his X disease and the symptoms and results of chronic intestinal stasis were one and the same thing. The state is characterized by low pressure, constipation, cyanotic extremities (the "blae" type), livid skin, sensitivity to cold, weak pulse and a marked tendency to venous congestions, easy fatigue and nutritional changes. The symptoms of X disease (Sir James MacKenzie), chronic intestinal stasis (Sir Arbuthnot Lane) and hyposphyxia (Martinet) are almost identical. Martinet puts down his syndrome entirely to pluriglandular deficiency; perhaps today it might be more correct, and going a point further, to say that the syndrome of Martinet plus the pluriglandular deficiency are both secondary to chronic autoxæmia—the view held by the other two distinguished writers.

The psychoneurotic tend to run a continuous low pressure (they are frequently toxic individuals), so do the anaemic, and there is a group often running in families where there is a lack of tone in the cardiovascular functions with resulting hypotension. We are, of course, familiar enough with the low—and often dangerous—pressures following traumatic shock, prolonged anaesthesia, haemorrhage, etc. But this is generally temporary and belongs to a different group. The serious type I think we know something of; but the type I wish to discuss perhaps we know less of, namely: Given a patient, where we can exclude grave underlying states, who seems in good health generally, but whose pressure is exceedingly low, what signifi-

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cance has this hypotension; in what way is it going to affect the physical and mental well-being and vigour of that patient; does a sword hang over him (as often seems to be thought); is the patient a bad operative risk; is his future prognosis serious and his life likely to be materially shortened? An attempt to answer these questions can, perhaps, best be made by quoting some cases.

1. Some eight years ago I was consulted by the late Dr. Robert Thomson, of Margate, about a patient of his, a stout woman of 42, three months in her fifth pregnancy. She had been vomiting seriously for a very considerable time, could keep nothing down, the odour of acetone was pouring from her breath, and the urine contained much di-acetic acid. Pulse-rate, 80; blood-pressure, 75-65. The surgeon was anxious to empty the uterus, but in face of the blood-pressure—perhaps less understood then than now—was anxious about the giving of an anaesthetic. In the hope of improving the pressure we agreed to a preparation of two days. During this time she had many doses of pituitrin, plenty of strychnine, and everything else one could think of to raise pressure. At the end of the time the pressure was where we began—no response at all. I gave her open ether, the uterus was emptied, and she made an uneventful recovery, the pressure remaining just the same after operation and for a couple of years after, when I lost touch with the case. I do not know her pressure now, but I do know she is in good health, and has had a full-time child since. This patient was strong and active and complained of fatigue only.

2. In 1916 I was consulted by a patient I have had continuously under observation to this day. Age then 58, he complained of fluttering of the heart and easy fatigue. The heart was sound. Blood-pressure 95-75. Pulse regular, rate 68. A man of plenty of physical energy and enormous mental power and concentration, he ran successfully many and large financial concerns. He was too stout, and was the victim of chronic intestinal toxæmia. Two years ago, age then 67, a double antrum operation was done under chloroform anaesthesia. He made a perfect recovery without the slightest sign of shock or disturbance. The pulse never quickened and the blood-pressure remained the same. Five months ago, age then 69, a very difficult prostate was removed as he was getting varicose bleeding from the bladder and back-pressure on the kidneys. The same evening he was very fit, no post anaesthetic vomiting, bright and cheerful, and without a suspicion of shock or general systemic disturbance. Today he is vigorously directing the many strenuous affairs in which he is concerned, his mental powers and his power of concentration are as good now, just on 70, as they have ever been. Under active detoxicating treatment the blood-pressure of late has gone up to 130-80.

This case well exemplifies the following questions: (a) Operative

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risk; (b) the sustained physical and mental vigour; (c) the significance—or gravity—of persistent hypotension; (d) the prognosis when the pressure was first discovered and the question of the shortening of life.

3. A patient who has recently come under observation is a woman of 41. She has very good health, can do a great deal physically, has exceptionally well-developed muscles—although she carried too much weight—and mentally is so capable that she directs most successfully very large concerns indeed. She has a blood-pressure of 78-70. Previous to consulting me it is possible the pressure may have been lower still as various medical men who have examined her over a considerable number of years regarded their instruments as possibly having failed and always confirmed their readings with a second—a mercurial—manometer. Two of them at least told her they had never known a pressure so low. Yet her success and her way of dealing with large financial projects is phenomenal. An unusually low pressure has not interfered either with her physical energy, her great mental capacity or her general health. The sense of fatigue is the only symptom.

4. A surgical colleague of mine, age 41, has a persistent systolic pressure of 90, unless he is particularly fit when the pressure is 100-80. Physically he is active, mentally he is more than alert, and the only thing he complains of is fatigue—after he has done several abdominal operations on end! With the pressure he has he carries on the strenuous life of a very live surgeon.

5. A patient who has recently come under observation is 81 years of age; she has a long history of low pressure. Apart from some periarthritic changes due to colonic stasis she enjoys the most wonderful health. She has a skin like a girl, mentally and physically she is full of energy, and she has every faculty perfectly preserved. Her blood-pressure is 110-80, whereas she would be entitled to 150 or 160 systolic without, perhaps, anyone considering this pathological. I should regard as good her chance of life for ten years or more; she looks about 65.

6. A woman, age 34, of powerful physique, has a blood-pressure of 95-72. She has plenty of physical vigour, but gets more easily tired than her physique would indicate. She is an example of gross chronic intestinal stasis, and has a highly toxic appearance. Otherwise she is very sound. She has a long history of low pressure.

These are a few examples to illustrate: (1) The effect on longevity; (2) the post-operative risk; (3) the physical and specially the mental capacity for work.

The conclusions I have come to are as follows, and are based on many cases frequently observed, and often watched over a period of many years—in health and in dishealth and often through periods of stress and strain:

1. A persistent low blood-pressure, provided it is

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not part of a grave syndrome—Addisonian, for example—does not of itself tend to shorten life, and—apart from being a part of any such syndrome—does not presage early dissolution. It has in the past been thought to do so by some writers, or, at least, that it may tend this way.

2. Persistent low pressure cases are not bad operative risks. On the contrary, they appear to tolerate operations particularly well. The usual short pre-operative treatment of these cases, with a view to raising the pressure by the use of drugs, is ineffective. Operations do not appear to lower the pressure still further. A high pressure case, with a severe post-operative drop, is always a source of anxiety, but is amenable to treatment and is capable of dramatic improvement. Low pressure cases do not appear to suffer from shock any more than cases of normal pressure—possibly because their cardio-vascular system is incapable of response. From the cases I have been able to observe, operations may be carried out without any more risk than in a normal pressure case; nor does chloroform appear to be particularly contraindicated, though in many cases, until further knowledge is gained on the subject, it would probably be wiser to substitute open ether or gas and oxygen where feasible and possible.

3. These low pressure cases are not generally the subjects of gross arterial degeneration. On the other hand, marked arterio-sclerosis may be accompanied by a very low pressure; thrombosis is then the danger.

4. The one symptom complained of by practically all very low pressure cases is easy fatigue; yet many of them are capable of very considerable physical exertion, and many are certainly capable of marked mental endurance. But they are liable to pay after. Some of the cases I have quoted directed vast commercial and financial enterprises, and these they could carry on

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with confidence, ease, sound judgment, and with the exhibition of unusual mental concentration. But this concentration was liable to be followed by rather tardily recoverable fatigue. Many of these cases have highly-toned nervous systems, but a vascular system greatly under-toned : a combination curious and hard to explain satisfactorily. Lord Dawson, in his lecture on hyperpiesis, delivered in America, laid stress on the vascular "over-toning" in hyperpietics ; in low pressure cases the state of vascular tone is exactly the reverse, and yet the subjects may be of a highly-strung and emotional nervous make-up. But in low pressure cases this over-stringing does not appear to fall on the vascular system. Under emotion, low pressure cases do not show the rise in pressure seen in hyperpietics ; perhaps their vascular mechanism is incapable of much response. I think this is the explanation. Their first reading may generally be taken as their normal ; this is anything but the case with hyperpietics, whose first readings are almost invariably above—in some cases greatly above, even to the extent of 20 or 30 mm.—their normal readings when free from exciting or emotional stimuli.

5. The vast bulk of the cases I have examined have been toxæmic, some to a very gross extent. So far as I have been able to observe, the commonest source of toxæmia has been intestinal ; almost invariably I have found them the victims of chronic intestinal stasis with marked colonic absorption. On the other hand, some intestinal poisons, probably diamines set free from intestinal putrefaction, appear to have a definite pressor effect and to be the cause of a good many high pressures. It is, I think, quite possible and likely that some subjects let loose depressor toxins and others toxins of the pressor variety ; this seems a feasible explanation, though difficult to prove positively. These toxins in different subjects may have a selective affinity—in one case alighting on the vascular apparatus

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and in other cases falling on other structures. This does not appear an unreasonable supposition, knowing as we do the selective affinity of different organisms and toxins for different structures.

6. Low pressure *per se*, is not a dread state; no sword is ever hanging over the chronic low pressure possessor; it does not appear to predispose to an evil prognosis, and it need not create in the mind of the medical attendant an atmosphere of doubt, of suspicious dread, and a fear of things unknown. I have only once witnessed sudden death in a low pressure case (a man of 60, blood-pressure 100-80), and this was post-influenzal, and followed on an injudicious act on the part of a man suffering from old myocardial degeneration.

7. The state often indicates a lowered general tone; but the lowering of tone is due to toxæmia (of which the low pressure is merely a symptom) and not to the presence merely of a low pressure. Treatment should be directed towards combating the toxæmia; not primarily, at any rate, to a direct attempt to raise the pressure, the low pressure being merely symptomatic. To treat the pressure alone is to tackle an end result, leaving the source of the trouble entirely alone; hence little benefit can be expected by treating the result instead of the cause. And this explains our failure to raise a permanently low pressure by primarily exhibiting pituitrin, strychnine, etc. After clearing up the toxin formation area, these drugs have a useful sphere, but not so long as the toxæmia persists unabated.

8. A persistent, inveterate and progressive lowering of the pressure in tuberculosis, in acute lobar pneumonia, in cahectic states as in cancer, and in the idiopathic anaemias, is a grave sign and is almost invariably a herald of impending dissolution. This is also true in many cases of chronic nephritis, and in them is an ominous sign of impending uræmic states and failing myocardial muscle. It is the faint but certain cry of

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a failing cardio-vascular and vasomotor mechanism.

9. In young people very low pressure may be indicative of a pretuberculous state, and may be a useful diagnostic point.

10. Beware of the normal or hypertonic case where, after operation, the drop is gross and persistent; he will probably die from vasomotor paresis—toxæmia will overwhelm him. A patient of mine, age 60, systolic pressure 140, had a colostomy for intestinal obstruction and, later, an operation for removal of part of the colon along with the carcinoma. All went well except the pressure; this fell to 75–80 systolic, and never rose. He died on the fourth day with a falling pulse—paresis of the vasomotor system, with consequent failure to eliminate his toxins.

TREATMENT.

This should be directed against the toxæmia producing the state of low pressure. A correct diet is essential—dairy produce, fresh fruits in abundance, salads and vegetables, and a genuine wholemeal bread, with abstinence from all kinds of flesh—quite the opposite to the usual diet prescribed; it is of no avail to push meat and meat extracts into a colon already rife with putrefaction; they merely cause greater putrefaction. Foods richest in the various vitamins should be insisted on, but these need not include flesh. In marked cases lavage of the colon, abdominal massage, exercises and a Curtis belt should be prescribed.

For drugs, the most efficient are generous doses of liquid paraffin, along with kaylene, and enough belladonna to produce mild physiological effects (about 8 minims twice daily of the tincture), with one or two taxol pills with each meal. A vaccine prepared from the faeces may be of great help, especially when the culture is chiefly streptococcal. Regular exercise should be enjoined, all the sunlight possible, natural

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and artificial, and every general law of hygiene should be complied with.

When the toxæmia has been cleared up, say in three months, pituitrin is useful, though its effect on the persistent chronic case has none of the dramatic element sometimes observed in cases of shock. Strychnine is probably the most generally useful drug we have in this connection. It has a definitely tonic effect on the vascular mechanism—provided always that mechanism is previously freed from the deleterious clogging and inhibitory effect of the absorption of perpetual devitalizing toxins. Under this regime the pressure will generally rise to a more normal level (I have often seen rises of from 20 to 30 mm.). Even if the pressure should not actually come up to our idea of the normal, the sense of well-being of the patient and the disappearance of the one symptom so universally complained of, namely, the sense of fatigue, will well repay the time and trouble spent.

I recently asked an experienced surgeon the following question: "Were I to bring you an adult patient with a very low pressure—say 80 or 90 systolic—and were I to ask you to perform a serious abdominal operation, what would your feelings on the matter be?" He at once replied, "I should be afraid." I then said to him: "Do you think this would be the general feeling among surgeons?" The reply was, "Yes."

There need be no fear. It is my belief that these low pressure cases are not capable of developing a still lower response—of producing anything worse than they have already produced—and herein, I think, lies their safety. They are certainly not in danger with what for them is a chronically low pressure—things may adjust themselves to it; acclimatization may take place—even under operation and prolonged anæsthesia. They are comfortably irresponsible. And herein, too, lies our safety.

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The Personal Factor in Medicine.

By J. KENELM REID, M.B., Ch.B.

Late Neurological Specialist, Ministry of Pensions, etc.

IN my article in THE PRACTITIONER of August, 1927, it was argued that an important relation existed between an individual's conscious mind and all his vital processes. Here the nature of this relation is reaffirmed, as follows. Definite and long-continued thought of a bodily change tends to set in motion such unconscious vital machinery as can realize that change objectively and organically. How this necessarily complex process takes place is as yet a complete mystery : we only know that, for reasons the chief of which have already been discussed, it must take place.

There are certain immediate results, such as the movement of muscles, which the mind can produce in the absence of even a rudimentary understanding of the *modus operandi*, the physiological sequences lying outside the field of ordinary consciousness. Therefore no one can help believing in the existence of a "directive mento-organic association" of the "immediate" type. Our proposition represents simply an extension of this belief; a conception that there is also a directive mento-organic association of the "intermediate" or "deferred" type, which in time enables continuous habits of thought to benefit even organically diseased tissues.

It is now proposed to enlarge this conception further, still with a practical object in view, by linking with it one of the fundamental principles of Nature, that of vibration and radiation.

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The steps of the reasoning are, briefly, as follows:

If by way of a working hypothesis we assume that the principle of vibration and radiation is applicable to all forces (an assumption which seems reasonable), then the common idea that one person can affect another only by means of manipulations, physical agents, speech, gesture, or other impressions made upon the recognized sense organs, must be mistaken. If the truths of radioactivity and sympathetic vibratory resonance are regarded as universal, then there is no escape from the conclusion that one individual must be able in some way to affect another by means of the radiation of force.

Now, according to the principle of intermediate mento-organic association, organic processes tend to be brought into line with conscious intention. What may be called the "set" of the conscious mind, influences profoundly the disposition of vital forces operating outside its own realm. If, then, these forces are conceived as vibratory in their ultimate nature, and if the principles of radiation and sympathetic resonance are admitted in this sphere of vibration as in others, it must be granted that one person can, by persistently cultivating certain thoughts about another, affect the latter's mind (perhaps only subconsciously) and secondarily his body, just as he can affect his own body. For the sake of convenience we may call this kind of hypothetical effect which one person can have upon another the "radiative personal influence."

The position may now be summarized as follows. We cannot reject this last conclusion (that the "radiative personal influence" exists) without rejecting either (a) the hypothesis of intermediate directive mento-organic association, or (b) the hypothesis that the principles of vibratory radiation and sympathetic resonance hold good for mental and vital forces as for others; and it must be admitted that the rejection

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of either of these hypotheses is difficult. If we accept the hypotheses and the conclusion, a question of vast importance arises. To what extent is the organic healing of one person by another due to the "radiative personal influence"?

Before this question can be answered, it is necessary to define as far as possible the position of physical therapeutic agents, such as drugs, sera, electrical devices, rays and so forth, in relation to present-day scientific medicine. The investigation of this matter also reveals, as we shall see, the facts from which the hypothesis of "radiative personal influence" can be arrived at by inductive reasoning.

It is a somewhat astonishing fact that many physicians still credit physical therapeutic agents with a far greater intrinsic therapeutic power than can reasonably be attributed to any mechanical properties, although the unsoundness of their outlook becomes immediately evident as soon as we pause to consider what sort of process healing is. Healing, we know, is the result of a number of processes of infinite complexity which, being marvellously ordered and adapted to the vital needs from moment to moment, are subject to continual flux. It is clear, then, that no physical substance or force, the qualities of which are necessarily fixed and stereotyped, can of itself cause and maintain healing. Doubtless it is possible for the stereotyped effect of a mechanical thing to favour the living, changing process called "healing" by happening at a particular period or moment of time to be just the effect needed; but does this consideration suggest a completely satisfactory explanation of the actual organic results obtained in practice by employing physical therapeutic agents? By no means, as the following facts will show:

(1) Different physicians, employing the same physical agents under what appear to be the same or very

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similar conditions, get widely different results.

(2) It constantly happens that, whereas in one case the expected result does not occur, in another it exceeds anything which might reasonably be attributed to the agents employed.

(3) It is often discovered that through an oversight the wrong agent has been employed, but that the effect on the patient has been just the same as if the right agent had been used.

(4) It frequently happens that for a time an agent proves extremely valuable in the treatment of certain conditions, but if anything disturbs the confidence reposed in it its value begins at once to diminish.

(5) The constant employment of an agent for a particular therapeutic purpose tends to increase its specific efficacy in this direction, unless and until confidence in it begins to break down. This holds good only for a certain type of enthusiastic doctor, who is not overburdened with materialism; and moreover it holds good irrespective of any definite development of the technique or radical change in the employment of the agent.

(6) The history of medicine reveals the fact that agents which we are now unable to conceive as having possessed any physical potency, were in fact used successfully, during the period of their popularity, in the treatment of both organic and functional disease. Such agents, inert so far as analysis shows, exist now and are employed with definite objective effect.

(7) If we take all the apparent effects of physical agents and divide them into four groups: (a) those which are relatively constant, (b) those which are relatively variable and unprophesiable, (c) those which are gross and lack the appearance of purposefulness (e.g., effects of castor oil, atropine, chloroform, morphia), (d) those which are truly therapeutic, i.e., show evidence of a directive and selective principle (e.g., effects of

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(which at the beginning we saw was reasonable in the light of certain theoretical considerations) appears to explain satisfactorily not only these facts, but also the facts considered under the foregoing seven headings; moreover, results seem to improve in consequence of using it as a working hypothesis in practice, i.e. doing organized mental therapeutic work on behalf of patients. Obviously if any kind of interaction between mind and mind independently of the recognized channels of sense could be experimentally demonstrated beyond all question, this theory of psychic therapeutics would be rendered still more acceptable; but this has yet to be achieved.*

The work which is carried out on the strength of the theory is of the same nature as that of mental self-healing (previously described), except, of course, that the curative thought is directed, not to self, but to someone else. The physician's own consciousness of the patient's condition is corrected and constructively moulded in the manner best suited to the occasion, the degree of effect appearing to depend upon a vast number of psychic conditions which cannot even be touched upon here. It might be supposed that a knowledge of anatomy, physiology and pathology would be valueless from the standpoint of mental therapeutics; but if the power of ideas depends upon their richness and truth and these qualities depend upon knowledge, then it is evident that knowledge of the mental and bodily functions must enhance the power of therapeutic ideas having to do with these functions. In fact, the vital importance, not only of character-building, but of scientific medical training in the physician, becomes more rather than less evident in the light of the theory of radiative personal

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salicylates in rheumatism, mercury in syphilis); we find close correspondence between groups (*a*) and (*c*) on the one hand, (*b*) and (*d*) on the other. Variability not being characteristic of the properties of physical agents, the inference is that the effects grouped under (*b*) and (*d*) are not purely the mechanical effects of the agents.

These seven considerations seem very strongly to suggest that the organic healing of one individual by another is not wholly to be explained by the mechanical effects of physical agents.

In conjunction with the theory of intermediate directive mento-organic association, the theory of suggestion might at first sight appear to provide us with the key to the problem; but clinical experience suggests that this theory is inadequate, for the following reasons : A physician's results may continue to improve after he has ceased to develop further his methods of treatment by suggestion. The significant fact is that, when this happens, the improved quality of the results appears to be connected intimately with an increase in the number and power of the physician's own therapeutic ideas, or, differently expressed, with the quality of the mental therapeutic work done by him on behalf of his patients. Then the results certainly appear to vary from day to day and week to week as the quality of this work varies, quite independently of the implantation of therapeutic ideas in the patient's mind by ordinary methods. This observation is only made possible by the fact that, as the physician's psychic therapeutic faculties develop through practice in certain directions, the results come more quickly in these directions, so that he is able to note variations of effect in relation to his own psychic states and to become aware of their independence of "suggestion" as ordinarily understood.

Now the hypothesis of radiated personal influence

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influence.

According to this conception of medicine physical systems of treatment may be valuable in two ways: (1) by aiding healing in some mechanical way, as does surgery, (2) by powerfully focusing the therapeutic thought and feeling of both physician and patient in the desired directions. No one who has attempted mental therapeutic work, either on his own or on another person's behalf, remains for long unaware of how necessary to this work physical systems of treatment are. In them and around them thoughts become crystallized, fixed and potent in a manner which at the present time is not possible under any non-physical conditions of treatment: and this is not surprising, seeing that the most definite and organized part of our consciousness is physical. From this point of view the best physical system for a particular physician is the one which makes the best link between him and his patients, and it is certain that excellent results of an organic and objective nature can occur from the use of such a system, even though its mechanical value appears to be nil.

It has often been pointed out that medical science has to do, not only with the mechanism of the body, but with the life in it; yet it does not seem to have occurred to many people that, if this is so, there must be some other possible principle of treatment of the body besides a mechanical one. In this paper the reasons have been given for supposing that the "life" principle of treatment is identical with that of the radiation of psychic influence, and the belief is expressed that if the principle is respected during the development of medical technique the results will improve.

Colostomy Life.

By L. P. GIBSON, M.R.C.S., L.R.C.P.
Cowes.

SUCH a great deal of misunderstanding exists among practitioners about the mental and physical state of a "colostomy life," which is looked on by nearly every one of them with horror and dread, that it is not surprising the patients' attitude towards it is one of even more exaggerated disgust. Having collected some first-hand evidence about this condition, it may be useful and helpful to write them down more or less in detail; and while not suggesting that the state is to be envied or is anything but a calamity, it is certain that the frequently expressed "I would rather die" opinion is unnecessary and ignorant. The importance of early operation in bowel growths cannot be over-urged; and delay having come under my notice on several occasions owing to these opinions, I feel that this short article is justified on these grounds alone.

Speaking generally, the time taken daily in dressing the outlet and the inconveniences are small, and in particular the description may be useful of the experiences of a colostomy case of over eight years' standing, performed for growth in the lower bowel. For some years no washing out of the bowel was done, but although it was nearly entirely educated to act spontaneously every morning, this took some little time, and was not quite reliable, small motions occurring during the day. Now, therefore, after breakfast in bed at 8 a.m., every morning the bowel is washed out with warm water before the bath, and for the rest of the twenty-four hours there is no further action nor

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Practical Notes.

The Operative Treatment of Fractures.

C. L. Scudder observes that the operative treatment of fractures is no longer a last resort in treatment; it is in many instances the initial method of choice, and the recognition of this stage in the development of fracture treatment is a great step forward. Under present conditions, fractures fall into three groups: (1) those never operated on; (2) those always operated on, and (3) those in which operation must be looked on as of doubtful applicability. In the first group will be found Colles' fracture, fracture of the clavicle, many fractures in childhood or the adolescent period, and many birth fractures. In the second group will fall fractures of the patella with wide separation of the fragments; fracture of the head or neck of the radius with such displacement of the small proximal fragment that there would result without operation great limitation of pronation and supination; fracture of the olecranon with wide separation; fracture of the shaft of the radius with displacement; irreducible fracture of the shaft of the femur; certain spiral and oblique fractures of both bones of the leg in the middle or lower third; and fractures of the os calcis in which the line of fracture enters the astragalo-calcaneal joint. In the third may be included fractures in the humeral shaft above the middle and near the shoulder joint of both bones of the forearm, and many others. It should, however, always be borne in mind that the proper use of skeletal traction to the condyles of the femur or to the tibial crest, or to the malleoli or through the os calcis, may diminish the necessity for the use of the operative treatment by direct incision as an initial method of choice.—(*Journal of the American Medical Association*, December 3, 1927, p. 1917.)

The Use of Iodine in Thyroid Disease.

C. G. Heyd emphasizes the fact that iodine is a drug and its use in the treatment of goitre should be entirely in the hands of the medical practitioner. Iodine is pre-eminently useful in goitre prophylaxis; it is immaterial how it is administered or in what form, provided that the dose is small and the treatment intermittent. It is useful in stabilizing function in the colloid type of goitre, but care should be exercised to eliminate adenoma in the diagnosis; adenomata are infrequent before twenty years of age. Iodine is indicated for a short period of time, but without a gap as a pre-operative measure in Graves's disease. It is indicated as a post-operative measure after all types of goitre operations. Its use in adenomata is variable, but pre-eminently dangerous as initiating hyper-thyroidism in non-toxic adenomatous goitres. When used

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need for changing the dressing, except in the case of eating or drinking very unwisely.

No special colostomy belt is worn, but only a plain cotton-wool pad with several pieces of toilet paper on it, kept in place by a cotton binder with a perineal band pinned over it, and an ordinary abdominal belt worn over that—reinforced, if necessary, by a flat celluloid pad for very strenuous exercise—to ensure sufficient support to prevent a possible hernia. Diarrhoea is, of course, a disaster, but is easily controlled by the well-known *Mistura cretæ aromat. cum opio* if persistent; the bowel, however, by itself gets rid of any irritating cause very rapidly.

This particular colostomy patient is over sixty and works hard, drives his own car, plays two rounds of golf a day with ease when he gets the chance, and most of the time entirely forgets the disability. No doubt, owing to bowel stasis having been done away with, he suffers no more from the rheumatism or neuritis that used to plague him formerly.

As time goes on, with these cases the external and internal sphincters that develop become more reliable, and the greater control which appears gives confidence. The sensation which evolves at or near the outlet and which gives warning when the bowels are going to act is reassuring, and is also interesting and a little difficult to explain when one remembers the absence of sensory nerves in those organs.

In conclusion, it may fairly be claimed that as an ordinary active life can be led with a colostomy, riding, shooting, golf and other games played, and that the patient can stay at hotels or friends' houses without being noticed as an invalid, colostomy life is not so black as it is sometimes painted.

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Vaginal Douches.

M. Forgue states that antiseptic vaginal douches irritate the mucous membrane and increase the secretions, and recommends instead the use of alkaline douches or, when the cervix is ulcerated, copper sulphate or picric acid. He gives the two following prescriptions :—

R	Zinc sulphate	-	-	15g. (5 iv)
	Copper sulphate	-	-	12g. (5 iii)
	Picric acid	-	-	6g. (5 iss)
	Camphor	-	-	2g. (grs. xxx)
	Distilled water to	-	-	1 litre (5 xxxij)

Sig. To be used as a douche in the morning, a wineglassful (5 v) in 2 litres (2 quarts) of water. And the following :

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M. P. Lereboullet insists on the importance of an exploratory puncture in the diagnosis of empyema in infants; X-ray examination is useful, but must not be looked upon as conclusive. When pus has been obtained by exploratory puncture, it must be examined in order to find out whether the infection is pneumococcic or streptococcic, which gives the indication for the serum to be employed in serotherapy. The pus, however, must always be evacuated, whether by puncture, employing a large needle, by siphon drainage, or by a large pleurotomy under local anaesthesia, excision of a rib being seldom necessary. The mortality of empyema lessens in proportion as intervention can be postponed, up to the sixth week; but not beyond that period; with intervention in the first week the mortality is 67 per cent., while it falls to 23 per cent. between the fourth and sixth weeks. The mortality is also lower as the age of the child increases, varying from 100 per cent. in infants under six months to 33 per cent. in children over three years.—(*Le Progrès Médical*, November 30, 1927, p. 1952.)

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M. Moncany publishes an analysis of the 17 cases of perforated gastric and duodenal ulcers upon which he has operated between 1923 and 1927; there were two deaths. All of the cases were males, 10 of them were under the age of 40, and the diagnosis of a perforated ulcer was made before operation in only 8 cases. The method of treatment varied according to the difficulties encountered. In 5 cases simple drainage of the pyloric region was carried out, either owing to the perforation being hidden by adhesions or because the perforation could not be closed on account of the friability of the tissues. In 2 cases the perforation was closed and drainage carried out. In 2 cases in which the perforation was not closed drainage was followed by a gastro-enterostomy, and in 2 other cases in which the perforation was merely occluded by omentum gastro-enterostomy was also done. In 6 cases the perforation was closed and gastro-enterostomy carried out. The 10 gastro-enterostomies were almost all posterior, and all of these cases were seen and operated upon early; there was no death among them.—(*Bulletins et Mémoires de la Société des Chirurgiens*, November 4, 1927, p. 665.)

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two classes of patients, those suffering from inflammatory diseases, and those suffering from diseases due to mechanical disturbances. Acute appendicitis is represented by the greatest number of cases in the first group, and it was demonstrated that age, duration of illness prior to operation, and the administration of cathartics had a harmful effect on the course of the disease, while previous attacks of appendicitis, contrary to general belief, did not seem to have an unfavourable effect on subsequent attacks. Primary peritonitis, although represented by only 10 patients, was important because of its usually fatal course; all patients suffering from that condition should have an early operation, as it can never be certain that appendicitis is not the cause. Acute intestinal obstruction is the most frequent abdominal disease in the group of mechanical derangements. Acute intussusception is the most frequent form of obstruction found, and next in order is obstruction due to incarcerated inguinal hernia. Intestinal obstruction in the newborn is always due to a congenital anomaly of the gastro-intestinal tract. Early diagnosis and early operation in acute intussusception are life-saving measures. One should not wait for all the classical symptoms and signs to determine diagnosis and treatment in this disease.—(*Surgery, Gynaecology and Obstetrics*, November, 1927, p. 595.)

The Treatment of Uterine Fibroids.

J. A. Corscaden observes that the frequency of fibromyoma of the uterus, the great variety of available methods, and the diversity of the indications for treatment demand a careful selection of method. Expectant treatment is the method of choice in small symptomless tumours. Curettage will exclude carcinoma, ease bleeding to certain intrauterine causes and relieve dysmenorrhœa. Myomectomy is reserved for women desiring children. Spuravaginal hysterectomy is employed whenever the tumour becomes a menace to the patient as revealed by signs of inflammation, degeneration, and rapid growth, and for bleeding from ulcerated surfaces. Complete hysterectomy is employed when the cervix would demand excision irrespective of the fibromyoma. Simple oophorectomy is performed in complicated cases where the completed operation would endanger the life of the patient. Sterilizing doses of radiotherapy are indicated for haemorrhage not due to ulceration, and for all other indications where hysterectomy is contraindicated. Non-sterilizing doses of radium or X-ray are employed only when child-bearing is desired and where myomectomy is impracticable.—(*New York State Journal of Medicine*, October 15, 1927, p. 1129.)

The Treatment of Ozæna.

P. Harvier has found that the *paradiphtheria bacillus* is constantly found in the nasal secretions of patients who are suffering from ozæna, and is of opinion that this organism is of the greatest importance in the causation of this very disagreeable and intractable condition. He has employed muscular injections of diphtheria

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anatoxin in the treatment of ozaena with great success. An injection of 0·5 c.cm. is given to begin with, followed in two days with an injection of 2 c.cm., and subsequent injections of 4 c.cm. are given twice a week for two months. The patient has then an interval of a month, and after that another series of injections may be given.—(Paris Medical, July 9, 1927, p. 47.)

The Treatment of Warts by the Application of Calcium Salts.

C. N. J. Gram has successfully treated 33 cases of warts with an ointment composed of 40 per cent. calcium carbonate or phosphate combined with lanolin. Several cases in which the warts had recurred even after energetic treatment with X-rays, yielded to this simple remedy. Dr. Gram has had no recurrences after an interval of two years in any of his cases. The disadvantage of the method is the length of time it must be continued. Improvement must not be expected under fourteen to twenty-one days, and in obstinate, long-standing cases it may be four to six weeks before the warts disappear. The ointment should be applied as frequently as possible during the daytime and should be left on overnight. It has the advantage of being quite harmless and non-irritant, the slight hyperæmia which may occur around the periphery of the warts which are undergoing treatment being part of the healing process and entirely painless.—(Klinische Wochenschrift, October 22, 1927, p. 2069.)

Barium in the Treatment of Gastric Ulcer.

L. Petschacher observed that when a citric compound of barium, citobarium, was substituted, on account of its pleasant taste, for bismuth salts in the opaque meal given preparatory to an X-ray examination of the gastro-intestinal tract, patients with gastric and duodenal ulcers declared that their pains were much relieved for some considerable time after the meal. This encouraged him to treat cases of gastric and duodenal ulcer and also cases of simple hyperacidity with this compound. He reports an analysis of thirty-five cases so treated in hospital. The usual rest in bed on a milk diet was given to these patients, but the only drug used in addition to the barium was belladonna. One part of citobarium was mixed into a cream with two parts of warm water, and a tablespoonful of this mixture was given every two hours during the day, and to those patients who were awakened by pain, during the night also. Most of the patients were free from pain after three days and were out of bed, on full diet, including meat, in ten days from the commencement of the treatment. Dr. Petschacher states that in his experience there is no other method of treatment available which so rapidly permits patients to resume their ordinary mode of life. Of his thirty-five cases, twenty-three became completely free from pain, ten were appreciably relieved, and in only two was there no improvement.—(Medizinische Klinik, November 11, 1927, p. 1726.)

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two classes of patients, those suffering from inflammatory diseases, and those suffering from diseases due to mechanical disturbances. Acute appendicitis is represented by the greatest number of cases in the first group, and it was demonstrated that age, duration of illness prior to operation, and the administration of cathartics had a harmful effect on the course of the disease, while previous attacks of appendicitis, contrary to general belief, did not seem to have an unfavourable effect on subsequent attacks. Primary peritonitis, although represented by only 10 patients, was important because of its usually fatal course; all patients suffering from that condition should have an early operation, as it can never be certain that appendicitis is not the cause. Acute intestinal obstruction is the most frequent abdominal disease in the group of mechanical derangements. Acute intussusception is the most frequent form of obstruction found, and next in order is obstruction due to incarcerated inguinal hernia. Intestinal obstruction in the newborn is always due to a congenital anomaly of the gastro-intestinal tract. Early diagnosis and early operation in acute intussusception are life-saving measures. One should not wait for all the classical symptoms and signs to determine diagnosis and treatment in this disease.—(*Surgery, Gynecology and Obstetrics*, November, 1927, p. 595.)

The Treatment of Uterine Fibroids.

J. A. Corseaden observes that the frequency of fibromyoma of the uterus, the great variety of available methods, and the diversity of the indications for treatment demand a careful selection of method. Expectant treatment is the method of choice in small symptomless tumours. Curettage will exclude carcinoma, ease bleeding to certain intrauterine causes and relieve dysmenorrhœa. Myomectomy is reserved for women desiring children. Spuravaginal hysterectomy is employed whenever the tumour becomes a menace to the patient as revealed by signs of inflammation, degeneration, and rapid growth, and for bleeding from ulcerated surfaces. Complete hysterectomy is employed when the cervix would demand excision irrespective of the fibromyoma. Simple oophorectomy is performed in complicated cases where the completed operation would endanger the life of the patient. Sterilizing doses of radiotherapy are indicated for haemorrhage not due to ulceration, and for all other indications where hysterectomy is contraindicated. Non-sterilizing doses of radium or X-ray are employed only when child-bearing is desired and where myomectomy is impracticable.—(*New York State Journal of Medicine*, October 15, 1927, p. 1129.)

The Treatment of Ozæna.

P. Harvier has found that the *paradiphtheria* bacillus is constantly found in the nasal secretions of patients who are suffering from ozæna, and is of opinion that this organism is of the greatest importance in the causation of this very disagreeable and intractable condition. He has employed muscular injections of diphtheria

Preparations, Inventions, Etc.

PLASMOQUINE.

(London : Bayer Products, Ltd., 19, St. Dunstan's Hill, E.C.3.)

Plasmoquine is a new synthetic drug intended as a substitute for quinine in the treatment of malaria; clinical trial has shown it to be highly efficacious. It is an alkyl-amino-6-methoxy-quinoline salt, which occurs as a tasteless, light yellow, finely granular powder, freely soluble in alcohol and very sparingly soluble in water; the action of the acid gastric juice converts it into the freely soluble hydrochlorate of plasmoquine. The specimen we have received for examination is in the form of plasmoquine compound (plasmoquine combined with quinine), which is stated to be preferable in the treatment of the subtertian variety of malaria, and for prophylactic purposes and in undifferentiated cases. Further, the occasional appearance of cyanosis—in itself of no serious import—which may in certain cases follow the administration of plasmoquine alone, is entirely obviated by the use of the compound.

METALIX X-RAY TUBES.

(London : Philips Lamps Limited, Philips House, 145, Charing Cross Road, W.C.2.)

Of the various Metalix X-ray tubes which are manufactured, there are two which seem to call for special mention, namely, the radiator-cooled 90 mA tube type DNR, and the type F for deep therapy. The former can be worked up to as much as 100 mA, using a suitable peak voltage, which dispenses the belief that radiator-type tubes cannot be made to stand loads above 30 mA. This is essentially a tube for radiography and screening, and is of workmanlike appearance and sound construction. The F type tube is for the treatment of deep-seated conditions by intensive X-rays. The X-radiation is generated entirely within a metal cylinder, and the only radiation that can emerge is through the window provided for the purpose. It embodies its own protection, and the old-fashioned protective measures are abolished.

ELECTRICAL APPARATUS.

(Glasgow : Messrs. Kelvin Bottomley and Baird, Ltd., 18, Cambridge Street, C.2.)

Messrs. Kelvin Bottomley and Baird have sent us particulars, with illustrations, of a number of new types of electrical apparatus, some of which are due to a scheme of co-operation which has been entered into between this well-known firm and the celebrated French firm, Gallois et Cie., of Lyons and Paris. In particular, the new outfit for alternating current circuits will include the highly-efficient

Reviews of Books.

Materia Medica, Pharmacy, Pharmacology and Therapeutics. By Sir W.M. HALE-WHITE, K.B.E., M.D. Nineteenth edition. Pp. viii + 712. London : J. & A. Churchill. 10s. 6d. net.

It is not necessary for us to enlarge upon the now well-known merits of this most popular handbook. That it has reached its nineteenth edition is recommendation of the highest order. It is due, however, to the author and the publishers to say that it has been thoroughly revised in accordance with the knowledge and teachings of the present day. The principal additions relate to the use of lead in the treatment of cancer, the use of bismuth for syphilis, and carbon dioxide in anaesthesia. The following matters have also received special notice : Oil of chenopodium, hydnocarpus oil, toxin antitoxin mixture and protein therapy. The vitamins are also mentioned, although there is no reference to them in the index. The properties of the several vitamins should, we think, have been accorded a special paragraph. The volume is, as usual, well printed and well bound.

Lippincott's Pocket Formulary. By G. E. REHBERGER, M.D. London : J. B. Lippincott Co. 15s. net.

THIS work is a therapeutic index arranged alphabetically under the headings of diseases, complaints, and symptoms. The remedies are not stated merely as drugs and pharmacopeial preparations, but are set forth as prescriptions with the suitable doses for administration. It has been designed to supply the busy practitioner with a vade-mecum which requires the minimum of effort to make its contents immediately available for service. To describe it as a book of prescriptions is not adequate, because it contains a very large amount of information as to measures of general treatment ; for instance, under diabetes mellitus there are about four and a-half pages of instructions as to diet and the administration of insulin. The prescriptions are given in apothecaries' weights with metric equivalents. Almost one-half of the volume consists of an alphabetical list of drugs of the United States Pharmacopœia, the National Formulary of the United States, and new and non-official remedies with their solubilities, dosage, and uses. This is a most useful compilation, particularly for English practitioners who wish to be acquainted with the essential matters contained in the U.S.P. and the National Formulary. For the medical man it would be difficult to find a more generally useful handbook. It is excellently printed and bound, and the format permits of its being carried comfortably in the pocket. It is something of a drawback that there is no pagination ; we have found this to be a distinct disadvantage, as we are unable to convey to our readers a clear idea of the amount of space allotted to the different sections.

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"open v" Gallois burner, which has made, of recent years, a great reputation for itself throughout the world. Another interesting new model is the "Ideal" shadowless operating lamp (a Gallois model), which gives a cool, diffused light, without shadows.

INVALID FURNITURE.

(London : Messrs. John Ward, Ltd., 243-245, Tottenham Court Road, W.1.)

We have received the new edition of the catalogue of the old-established firm of Messrs. John Ward, whose name is a household word as makers of invalid chairs. The catalogue is well illustrated and includes, in great variety, adjustable couches, reclining chairs, bath chairs, spinal carriages, hand tricycles, self-propelling chairs, folding wheel chairs, carrying chairs, leg rests, bed tables, etc. One of the most interesting specialities is the "Wardway" type of carrying chair, which is at the same time a comfortable chair of correct height for the desk or table, and can be used for wheeling the patient as well as carrying.

SHADOWFORM.

(London : The British Drug Houses, Ltd., 16-30, Graham Street, N.1.)

Shadowform is a special preparation for the ready production of a liquid barium meal for use in X-ray diagnosis. It has been found that the administration of plain barium sulphate, prescribed as a liquid "meal," presents some difficulty, as, being very heavy, it remains in suspension in a watery fluid for a very short time only, and it is difficult to avoid leaving a considerable proportion at the bottom of the vessel, while it also settles very quickly in the stomach. With Shadowform, however, the barium "meal" is easily prepared, requiring only admixture with water, and the resultant preparation is of cream-like consistency, palatable, opaque, and remains in suspension for a long time.

MULTIWIDTH PLASTER.

(London : Messrs. Fassett and Johnson, Ltd., St. John's Gate Buildings, 86, Clerkenwell Road, E.C.1.)

Multiwidth plaster is carried on a special spool, cut into various widths—quarter-inch, half-inch, three-quarters-inch, and one-and-a-half-inches—so that each size is easily at hand. The plasters provided are either Mead's rubber adhesive plaster or Seabury's zinc oxide plaster. This is really a most useful and practical device, and it is only surprising that it was not thought of before. It costs four shillings per spool.

AMPELAMINE.

(English Agents : The County Chemical Co., Ltd., Bradford Street, Birmingham.)

Ampelamine is a preparation composed of concentrated grape juice, without any other added substance. It is given diluted with at least twice the amount of water, and in fairly large quantities. It is recommended for all conditions in which the well-known *to convey to* is employed, such as acute and chronic gastro-intestinal to the different and in rheumatic and allergic conditions.

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MARCH

1928

Perforation of Gastric and Duodenal Ulcer.

By SIR BERKELEY MOYNIHAN, BART., K.C.M.G., C.B.,
M.S., F.R.C.S.

President of the Royal College of Surgeons; Emeritus Professor of Surgery, University of Leeds; Consulting Surgeon, Leeds General Infirmary, etc.

THE perforation of an ulcer of the stomach or duodenum may be acute, subacute or chronic.

It is *acute* when there is a sudden rupture of the base of the ulcer and the contents of the viscus are free to escape into the general cavity, and do so. It is *subacute* when the rupture is exceedingly minute; when it occurs after adhesions have been formed round the base of the ulcer; or when the little rent is quickly closed by a plug of omentum or lymph and the escape of the contents of the viscus is therefore circumscribed and the general peritoneal cavity is not contaminated. It is *chronic* when so firm an adhesion has formed between the ulcer and the abdominal wall, the pancreas or a neighbouring viscus, that the base of the crater is no longer formed by the stomach but by the parts to which the stomach adheres, the pancreas, the abdominal wall, the liver, the gall-bladder,

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ULCER PERFORATION

examination to have ulcers of the chronic variety.

It is certain, therefore, that the perforation, whose symptoms and treatment we are to discuss, is concerned, as a rule, with chronic rather than with acute ulcers. It is equally certain that perforation is consequently a preventable complication. For chronic ulcers of the stomach and duodenum should never be allowed to progress to the late stage in which this catastrophe occurs, and regard should be paid to any exacerbation of symptoms which may suddenly appear, for these are often the clear warning of that increase in pathological activity in the ulcer which ends in the rupture of its floor.

As an increase in pathological activity should never occur whilst a case is actually under medical treatment, perforation of a chronic ulcer should then be impossible. When perforation occurs during such treatment the ulcer is almost certainly malignant. The clinical records in cases of extreme surgical emergency with high death-rates are necessarily imperfect; but, so far as can be judged, it is safe to assert that not less than one-fourth of the total number of cases of perforation are heralded by such an increase in the severity of the recurring symptom—pain—that suspicion should be aroused as to the imminence of danger.

SIGNS AND SYMPTOMS.

The acute perforation of an ulcer is a terrible catastrophe. The patient is plunged at once into a condition of prostration and of unendurable agony unsurpassed, with one exception, in human experience. The pain is almost beyond description. It seizes the patient in a moment, and deals him a blow that he himself may think is mortal. It attacks the whole of the abdomen, and is especially severe in the upper part; it is described as "tearing," "racking," "burst-

etc. When a hollow viscus has adhered to the stomach, a chronic perforation results in the formation of an internal fistula.

Acute perforation may occur either in acute or in chronic ulcers. It affects chronic ulcers far more frequently than acute ulcers. The condition is therefore one of acute perforation in a chronic ulcer. It is necessary to be precise upon this point, for the literature of this subject contains many inaccurate assertions that perforation occurs in acute, rather than in chronic ulcers. In twelve consecutive years at the Leeds Infirmary (1910-1921) there were 61 deaths from perforation of a gastric ulcer; in 60 cases the ulcer was of the chronic variety. There were 117 deaths from perforation of a duodenal ulcer. In 12 of these cases there was an acute ulcer; in 4 of the 12 there was a chronic ulcer also, and it was in every case the chronic ulcer which had perforated. In 8 cases an acute ulcer had perforated. In my own list I find that the great majority of the cases of chronic ulcer which perforated had undergone medical treatment for longer or shorter periods on one or more occasions. The same experience has occurred to Sherren,¹ who records : "218 cases of perforated duodenal ulcer treated at the London Hospital; in 6 only was there no previous history of indigestion. Similar figures were obtained in 248 cases of perforated gastric ulcer. In haemorrhage due to a chronic ulcer the same applies. As the majority of these patients had had more than one course of medical treatment—several had been having intermittent treatment for ten years and one for thirty-two—we are perfectly justified in considering them failures of that treatment ; and, if surgery was unable to be employed successfully in these emergencies, the mortality is medical rather than surgical." Walton² found that of 79 cases of gastric or duodenal ulcer which were fatal, 78 were seen on post-mortem

ULCER PERFORATION

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ing," "horrible," "everywhere"; it spreads over the lower part of the chest and even up to the shoulders.

Appearance of Patient.—Within a moment or two the patient's appearance betrays his suffering. The face is pale, haggard, anxious and appealing; the eyes are wide and watchful; the brow and temples are bathed in sweat, the hair soaked. Horrible suffering quickly delves deep lines upon his cheeks. The patient struggles for breath in short, panting respirations which are chiefly costal, the diaphragm making not the slightest movement. The nostrils are wide, the mouth shut, and every expiratory effort is audible. He complains of cold, and feels cold when a hand is laid on him. The thermometer registers 96° or even a little lower. No movement is made that can be avoided, and words are spoken only in the shortest expiratory jerks, every syllable being part of a deep groan. If a hand is stretched out to touch his body, the patient shrinks from an added terror and will protect himself as best he can with his arms. His legs are soon drawn up. He reaches the very limit of human power to withstand suffering, and his appearance arouses the very gravest anxiety as to his state and may even suggest that death is hastening to him.

Shock.—The condition, indeed, is one for which no other word than "shock" seems fitting. Yet "shock" in the surgical sense is absent. Shock used in its strict sense means the condition in which an increased pulse-rate, a diminished blood-pressure and a reduced blood volume are present. Not one of these is found in the first hour or two after a perforation has occurred. The rate of the pulse is found to be normal, its quality, as a rule, good; the blood-pressure is within normal limits. The blood volume has been measured in only a few of our cases, but that, too, shows no change. It is, therefore, inadmissible to use the word "shock" without

ULCER PERFORATION

qualification to describe the state of a patient who is in the toils of this terrible calamity. "Shock" is a word used loosely enough. We are "shocked" to hear distressing news; we are said to be "shocked" when we mean that we are surprised. But these loosenesses are not justified in surgery. "Shock" is a word used by the surgeon with a definite significance, and has no other. Used in its strict sense the word "shock" is accordingly not permissible as describing the state of a patient in the early period after a perforation has taken place. This must be clearly understood; for every surgeon with large experience knows that a practitioner called to see a patient in this stage has deferred his diagnosis of the condition because of the normal pulse-rate. It has hardly seemed credible to him that so grave a catastrophe as perforation could occur without "shock," and shock he has always heard is an invariable symptom when an ulcer has ruptured. There is, of course, the most terrible prostration. Perhaps, apart from severe haemorrhages, no disease except acute pancreatitis (in which true shock is present) produces so profound a degree of prostration. We must, therefore, not less in the interest of accuracy than in that of the welfare of the patient, cease to use the word "shock" in this connection. Let us speak of prostration, a word which has only a clinical significance. Shock, it is true, comes later in these cases; it comes when peritonitis has developed. But peritonitis is not perforation; it is a late and preventable sequel to perforation. It is the perforation we seek to recognize; the peritonitis we seek to forestall.

Examination of Abdomen.—The examination of the abdomen in this stage reveals a characteristic condition. The muscles are in sternest rigidity. The hand travelling gently over the abdomen finds no soft or yielding area. Every part offers the most inflexible opposition to pressure; the rigidity is

THE PRACTITIONER

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steadily increasing in size, and its walls have still the same incoercible rigidity as before. Respirations remain hurried and shallow, for the diaphragm is now pressed upwards by the fluid and gas which are beginning to accumulate within the peritoneal cavity. Fluid has gravitated to the pelvis, and the peritoneum there, acutely inflamed, may be recognized as exceedingly tender if a rectal examination is made. It is in this stage, as a rule, that vomiting first appears. This symptom is by no means frequent, and is very rarely severe.

Liver Resonance.—The abolition of liver dullness is often asserted to be a sign of great value in the diagnosis of a perforated ulcer. It appears at a time when the diagnosis should be made without any difficulty; it is a late and not an early sign. Resonance above the edge of a liver which can be felt is not unusual when gas is present in loops of large or small intestine which creep towards the diaphragm; and to percuss in the mid-axillary or posterior axillary line means discomfort to the patient, who should be spared all unnecessary disturbance. On the operation table, resonance over the liver between these lines will often be found in the case where delay has occurred. Free gas within the peritoneal cavity will rise to the highest part. If the patient lies flat on his back it will ascend to the umbilicus; if he is sitting upright it will collect beneath the diaphragm, or make the best attempt possible to do so, though it may be prevented by adhesions. If it succeeds, then the liver dullness will diminish in proportion to the amount of free gas present; on the left side the splenic dullness, rarely a very definite area, will disappear also. The value of percussion is therefore to be regarded as important if it shows an absence of liver dullness, especially if, an hour or two before the dullness has been recognized; but unimportant if the liver dullness is found to be

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obdurate, persistent and unyielding. There is no movement. The diaphragm, largest and strongest of abdominal muscles, is as rigid as the rest, and the shallow, frequent respiration finds in this its explanation. All parts, too, are tender, though the upper abdomen is, as a rule, definitely more sensitive than the lower. One side of the upper abdomen may be a little more resistant and a little more tender than the other. And this may help to decide whether it is a gastric or a duodenal ulcer which has given way. Only the most gentle examination is permissible; it is unnecessary and indeed inhuman to do more; for the diagnosis of a surgical emergency requiring immediate relief is beyond doubt, and the sooner a dose of morphine is given and preparation made for operation, the better.

Prostration.—The period of initial prostration varies in different cases, and its length depends no doubt upon many factors : the size of the perforation, the condition of repletion of the stomach, the general powers of resistance of the patient, etc. As a rule it lasts not less than an hour and rarely more than two hours. It is followed by a period of reaction. Little by little the pain subsides ; though still remaining very severe, the sharp edge of it is blunted. The cold greyness or pallor of the face is followed by a slight flushing, an indication that the general circulation is becoming more vigorous. The pulse-rate rises, the limbs grow warm, the temperature reaches or slightly exceeds the normal. Relief from an agony that has almost passed belief may persuade the patient that all is well. The victim lifted from the rack fell asleep, though his residue of pain would have seemed acutest suffering but for its comparison with the far greater agony from which he had just escaped.

Pain and Vomiting.—Pain in this period is still present and severe enough. The abdomen is

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steadily increasing in size, and its walls have still the same incoercible rigidity as before. Respirations remain hurried and shallow, for the diaphragm is now pressed upwards by the fluid and gas which are beginning to accumulate within the peritoneal cavity. Fluid has gravitated to the pelvis, and the peritoneum there, acutely inflamed, may be recognized as exceedingly tender if a rectal examination is made. It is in this stage, as a rule, that vomiting first appears. This symptom is by no means frequent, and is very rarely severe.

Liver Resonance.—The abolition of liver dullness is often asserted to be a sign of great value in the diagnosis of a perforated ulcer. It appears at a time when the diagnosis should be made without any difficulty; it is a late and not an early sign. Resonance above the edge of a liver which can be felt is not unusual when gas is present in loops of large or small intestine which creep towards the diaphragm; and to percuss in the mid-axillary or posterior axillary line means discomfort to the patient, who should be spared all unnecessary disturbance. On the operation table, resonance over the liver between these lines will often be found in the case where delay has occurred. Free gas within the peritoneal cavity will rise to the highest part. If the patient lies flat on his back it will ascend to the umbilicus; if he is sitting upright it will collect beneath the diaphragm, or make the best attempt possible to do so, though it may be prevented by adhesions. If it succeeds, then the liver dullness will diminish in proportion to the amount of free gas present; on the left side the splenic dullness, rarely a very definite area, will disappear also. The value of percussion is therefore to be regarded as important if it shows an absence of liver dullness, especially if, an hour or two before the dullness has been recognized; but unimportant if the liver dullness is found to be

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normal. In other words, the loss of liver dullness as a positive sign in the absence of meteorism is significant, even decisive; the presence of liver dullness neither helps nor denies a diagnosis.

Progress of Patient.—As time passes, the state of the patient grows progressively and rapidly worse. Vomiting may be repeated, and hiccough, sometimes exceedingly distressing, may develop. The abdomen grows larger and larger, fluid may be present, and a shifting dullness may indicate its quantity. The face grows hollow and the expression strained and weary. The features appear sharp, the skin is livid and sweating, and is often cold and clammy. The pulse deteriorates in value and increases greatly in frequency. The whole condition and appearance of the patient indicate the extreme gravity of the case, and a fatal ending may be expected within three or four days unless operative measures can bring relief.

PREVENTION OF PERFORATION.

The duty thus laid upon our profession is clear. We must take pains to become familiar with the signs and symptoms of chronic ulcer of the stomach and duodenum, so that this fatal catastrophe may be prevented. The perforation of a gastric or duodenal ulcer is preventable in the large majority of cases; it is an evidence therefore of neglect somewhere; of neglect on the part of the patient to attend to his own malady by consulting a medical man or to follow advice which has been given to him. It is an evidence of neglect on the part of the medical man, if he has failed to recognize the condition and to give appropriate counsel when the patient has consulted him. It is an evidence of neglect on the part of the physician, if he has not given utmost emphasis in his advice to the truth that it is not only a relief of symptoms which the patient must consider, but also the healing of the ulcer,

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and that this may be a matter of many weeks, and not only of a few days. It is not important that we should have an equal knowledge of all diseases; it is important that all who are in general practice should have the clearest knowledge of the diseases which immediately and irrevocably assail human life. It is as important to know the full truth about ulcers of the stomach and duodenum, as it is to know how haemorrhage may be arrested, or how strangulation in a hernia may be recognized. If we fail to recognize an obscure lesion of the brain or spinal cord, a few days' grace may be allowed for our study of these conditions; but failure to recognize the emergencies that we are now considering means the loss of a man's life. Not less than 90 per cent. of cases of perforation affect chronic ulcers. These ulcers should have been recognized months or years before this late complication in their history. Many patients have been treated for these conditions; some have been treated over and over again. Few have been urged to recognize the menace of the disease, its tendency to recur, the necessity for protracted treatment until weeks or perhaps even months after symptoms are in abeyance. The position is serious, as a contemplation of hospital reports from all parts of the country will show. It is our bounden duty to do what we can to improve it.

DIAGNOSIS OF ACUTE PERFORATION.

After perforation has occurred, there should be no difficulty in making a diagnosis of sufficient accuracy to dictate a policy of action. It is important only to know that something has happened within the abdomen which cannot be relieved by any other than surgical measures. It is not of real importance to know whether it is a duodenal or a gastric ulcer that has ruptured; or whether the pancreas has suffered an acute haemorrhagic inflammation; or whether the appendix is

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the causes of the symptoms and signs which are called forth in an acute abdominal crisis ? They are the result of disturbed reflexes. The organs affected, as Mackenzie, Head, Hurst and others have shown, are themselves insensitive to pain, and make no response to stimuli which, applied to the skin, would be intolerable. The effect of the application of stimuli to a viscous is expressed in terms of pain, hyperæsthesia and tenderness in the cutaneous nerve which is associated with the sympathetic nerve supplying the viscous. The viscera concerned in any of the grave abdominal crises are associated through their sympathetic nerves with the lower six dorsal nerves, which through the anterior and posterior branches supply the skin not only of the abdominal wall, but of the back. If we know the sympathetic nerve supply of any viscous, as we do, we shall also know the spinal nerve with which it is associated ; and as it is the spinal nerve which speaks for its silent associate, we shall know the area of distribution of the cutaneous sensations provoked by irritation of each sympathetic nerve ; and *vice versa*, if we know the surface manifestation we know also the viscous at fault.

The stomach, for example, receives its sympathetic supply from the nerves associated with the 5th, 6th, 7th and 8th dorsal nerves ; these nerves will therefore express by pain, hyperæsthesia and tenderness any irritation to which the sympathetic is subjected. The spinal nerves are distributed over an area which extends in front from the xiphoid cartilage to an inch or more above the umbilicus, and behind from the 5th dorsal spine to the 10th. The duodenal supply corresponds to the 9th and 10th dorsal nerves ; and this in front affects the skin above and around the umbilicus, and behind is related to the 11th and 12th dorsal spines. The small intestine is related to the 8th, 9th, 10th and 11th spinal nerves, whose area in front extends from

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sphacelated. All these things can be recognized at once when the curtain of the abdominal wall is lifted. The one essential thing is for the medical attendant to recognize that something is threatening life, and that the sooner the threat is removed the better.

All the symptoms and signs related above should be remembered; but for a policy of action it is enough to know that when an acute intolerable attack of agony comes suddenly, and the abdominal wall is at once on guard, intensely resistant and unyielding and everywhere tender, the cause may be this or that, but the remedy lies in operation and in operation alone. We must disabuse our minds of the belief in the presence of "shock," if the word be used in its surgical sense. If we use the word to indicate the appearance and not the state of the patient, then and only then, can we say that the victim of a perforation suffers from shock. There is no doubt that a condition is present, whatever name we attach to it, which makes the ordinary surgical procedures carry a risk greater than that which ordinarily attaches to them. But the danger is that if we allow ourselves to suppose the shock must be present before we are entitled to diagnose the existence of a perforation, then we shall be permitting a patient to drift into the condition of shock that develops some hours later; and only then shall we be able to make a diagnosis. And these hours of delay may cost a patient his life. Many of those who have recorded their experiences have arranged their cases in groups representing operations performed within 6 hours, between 6 and 12 hours, between 12 and 24 hours, and over 24 hours. All such tables show a gradually rising mortality. After 48 hours the mortality falls a little, for the clear reason that cases surviving so long are, in truth, examples rather of subacute than of acute perforation.

Disturbed Reflexes.—What is the cause or what are

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above the umbilicus to the lower part of the hypogastrium, and behind extends from the 9th dorsal spine to the 2nd lumbar spine inclusive. The gall-bladder and the bile ducts are in relation to the 7th, 8th and 9th spinal nerves. The diaphragm supplied by the phrenic nerve is brought into association with the 3rd and 4th cervical nerves, from which the phrenic nerve springs. A reflex pain may, therefore, be referred to a zone which extends from the nape of the neck to the 7th cervical spine behind, embraces the supraspinous fossa and the acromio-clavicular region laterally, and in front lies above the sterno-clavicular articulation. The visceral peritoneum shares the sympathetic supply of the organ which it clothes. The parietal peritoneum, however, is supplied by the spinal nerves, and together with the loose connective tissue lying external to it, possesses a lavishly distributed plexus. The visceral peritoneum may suffer much injury, through incision, the application of the cautery, and so on, without conscious response; the slightest injury to the parietal peritoneum is acutely resented, and the severest pain is felt when it is put upon the stretch.

Viscero-sensory Reflex.—When a gross destructive lesion affects any viscous, the sympathetic nerve or nerves communicate their misfortune to the spinal associates who at once raise the alarm. The reflex experienced may be sensory or motor. The viscero-sensory reflex is expressed in hyperalgesia, the viscero-motor in muscular spasm, that is, rigidity in the implicated area. As soon as the parietal peritoneum is involved, however, the effects produced are no longer reflex, but are direct, since this membrane is possessed of its own spinal nerve supply. A frequent and convincing illustration of this truth is seen in cases of acute appendicitis. The initial acute pain indicating obstruction, gangrene or perforation is felt in and especially a little above and around the

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umbilicus; at a later stage, and only in a later stage, are the signs and symptoms localized in the right iliac fossa. So true is this that it may be accepted as very probable that when an acute attack of pain is first felt in this fossa the cause is not to be found in disease of the appendix.

The detection of cutaneous hyperalgesia, the viscero-sensory reflex, in any area requires a certain skill. It may be gauged by stroking the skin with a pin held at an angle with the surface; a vigorous scratch must be avoided, for that would discover sensitiveness in all. A short, gentle stroke is first made on the normal skin of the chest or thigh, and then on the abdominal wall. A better method is to pinch a little fold of skin lightly between the thumb and forefinger and draw this away from the underlying muscles. If a disturbed reflex is present it causes the patient to wince; a quick involuntary movement is made, or a hand lifted to protect the tender part. This method has the advantage that, pressure over the parietal peritoneum being avoided, hyperalgesia can be differentiated from tenderness.

These procedures have a value which is very differently appreciated by different observers. They are said by some to "tell you nothing," by others to be "very valuable." A good deal depends upon the stage of the condition in which the examination is made, and perhaps even more upon the care with which it is made. In the earlier phases of any acute condition when this is strictly localized, they do, beyond doubt, give definite indication as to the viscus which may be involved; in a later stage, at a time when the effects of the initial lesion are widespread, and this is the usual condition, they give no help and may even be confusing. The viscera, themselves insensitive to pressure, may yet appear to be tender to pressure. This is due to the implication of the parietal peritoneum which lies

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exist before actual perforation, both cutaneous hyperesthesia and muscular spasm are more definitely localized than they ever appear to be in those cases in which the base of an ulcer of the stomach or duodenum has been rent. The peritoneum does not appear to be equally sensitive to contact with all fluids. The acid gastric contents irritate it most, extravasated blood the least. Urine escaping from the intraperitoneal laceration of the bladder never produces an impenetrable rigidity of the abdominal muscles; nor does the bile which leaks from a burst gall-bladder.

Abdominal Rigidity.—The abdominal rigidity present in cases in which an ulcer has perforated is extreme. No handling, however gentle, however prolonged, discovers one instant of yielding. The muscles remain immobile and unrelaxed throughout; and the diaphragm, strongest of all abdominal muscles, is equally inflexible. The whole contents of the abdomen are surrounded by fixed, firm, unyielding walls, which make no concession to the gentlest hand. The spasm provides the perfect muscular splint for the affected viscera. When this degree of rigidity is present, it infallibly indicates the presence of a lesion requiring surgical assistance for its relief. To this truth there is in my experience no exception. Universal unyielding abdominal rigidity indicates an intraperitoneal catastrophe. In the first few hours no measures other than those of general anaesthesia, and even those with difficulty, can abolish this rigidity. A large dose of morphine may lessen it; it seems powerless to dissipate it completely. This is fortunate; for other symptoms and signs, especially after the administration of an anodyne, and even without this, are apt to fade away, or perhaps to disappear in the stage of reaction. Rigidity remains. It is as true an indication of the presence of a crisis as all other signs and symptoms combined. No practised hand finds any difficulty in distinguishing this form of

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over them, and the more acute sensitiveness of its nerve plexus, which develops in consequence of this. There is need, therefore, for a clear distinction to be made between cutaneous hyperalgesia and local tenderness. The one is a reflex, the other a direct effect; the one is aroused in a viscous by a lesion which stimulates the sympathetic nerve or nerves, and this in turn stimulates the spinal nerve with which it is associated: afferent and efferent impulses are both at work; the other is a purely local effect excited by local causes, or expressed by a keener sensitiveness in the local nerve distribution. The viscero-sensory reflex is in my judgment of far less value than the viscero-motor reflex. The viscero-motor reflex is produced in exactly the same manner as the viscero-sensory reflex. The sympathetic nerve conveys the afferent impulse to the spinal segment involved, and this in turn communicates the impulse to the motor cells, which pass it to the peripheral nerve. The muscular spasm which results appears at once.

On one occasion I observed the patient at the very moment when perforation of a duodenal ulcer occurred. Within half a minute a hand placed upon the abdomen found it everywhere in a state of extreme rigidity. This intense rigidity and immobility seemed rather more extreme in the upper as compared with the lower part of the abdomen; but the difference was slight. At the operation, within an hour, there were signs of the escape of fluid, from a large gap in the duodenum, downwards to the iliac fossa, and 2 or 3 pints of almost clear fluid were present in the abdomen.

This free escape of fluid, probably exceedingly irritating to both parietal and visceral peritoneum, accounts for the development of a general abdominal rigidity rather than of a local muscular rigidity, which one would expect to find if there were only a limited area of sympathetic irritation in the affected viscous. All the abdominal muscles appear to be implicated from the first in cases in which there is free leakage from any viscous. When the acute lesion remains localized, abdominal rigidity, too, may be localized. In appendicitis, for example, where an acute gangrenous condition may

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clusion that a disaster has taken place within the abdomen, and that it is irremediable by any other than operative measures, is not difficult to reach. It may be impossible, even after the closest inquiry and examination by the most expert physician, to tell with accuracy the nature, the extent or the organ affected by the lesion.

It is necessary, therefore, to state the problems confronting the diagnostician in the simplest terms. They are these : a patient who lies prostrate and motionless, who has suddenly been seized by an attack of unsupportable agony within the abdomen, whose abdominal muscles are all inflexibly rigid without sign of movement and obdurately resistant to pressure, has suffered a disaster which needs the immediate aid of a surgeon. His condition does not enable us to localize the lesion, but merely to assert its existence.

The examination of a patient so grievously afflicted must be brief; motives of humanity no less than of urgent necessity compel us to hasten in decision and to be quick in action. Recent experience appears to show that the most positive evidence of perforation is derived from an examination by means of X-ray. While the patient's breath is momentarily held, a photograph is taken. The presence of a bubble of gas, free in the peritoneum, above the liver, is conclusive and the earliest evidence of perforation.

The patient may give a history of former attacks of indigestion, which may lead one to suspect, and even to be confident in diagnosing, an ulcer of the stomach or duodenum. The universal rigidity may appear even more perceptible at the upper part of the abdomen; and one side may seem to be more tender or more resistant than the other.

The fact that fluids escaping from the torn duodenum, or from the pyloric region of the stomach, encounter the little hillock in the *transverse mesocolon*

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rigidity from the stiffness of an abdominal wall voluntarily brought about by the patient during an examination which is expected to cause discomfort. If in such cases the hand is kept at rest on the abdomen for a few moments, especially when the patient's mind is distracted by questions, a yielding now and again, especially at the end of expiration, is soon discovered. No voluntary rigidity is ever so incompressible as that excited by a viscero-motor reflex. When the patient is asked to breathe deeply, the free movement of the diaphragm will show that no rigidity affects it. And the diaphragm is as much an abdominal muscle as any. If others are rigid because of a viscero-motor reflex the diaphragm, too, will be motionless.

DIFFERENTIAL DIAGNOSIS.

There are many acute abdominal catastrophes—disasters which affect the stomach, duodenum, gall-bladder, pancreas, intestine, appendix, pelvic organs, the spleen, the kidneys—in fact all the viscera brought into relation with the peritoneum. When calamity comes, it is an advantage to be able to recognize the nature and the locality of the lesion; but it is exigent that we should recognize that what has occurred, wherever its origin, is something which gravely and most urgently threatens life. To make an accurate anatomical and pathological diagnosis is a delight; to reach a decision that, wherever and whatever the trouble, the sooner measures of rescue are adopted, is a cardinal obligation. We must, in brief, know what to do rather than what has happened if only one of these is to be known. This much it is essential to say, for we sometimes hear of a delay in action because the medical man "did not quite understand what had gone wrong." If this attitude is adopted the whole problem will be simplified and the results of surgical treatment will be very greatly improved. The con-

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The fact that fluids escaping from the torn duodenum, or from the pyloric region of the stomach, encounter the little hillock in the transverse mesocolon

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and are deflected to the right, escaping down the outer side of the ascending colon to the right iliac fossa, where some accumulation may occur, accounts for the fact that the localizing signs of appendicitis may sometimes be quickly developed. An error in diagnosis was more frequent in the early days of our experience than today; but mistakes even now are not unknown. When I collected the first forty-nine cases of perforated duodenal ulcer,³ I found that in no fewer than eighteen had the diagnosis of appendicitis been made, and an operation performed for this disease. The difficulty in discriminating between the most severe forms of perforative appendicitis and cases of rupture of an ulcer is increased by the fact that in the former the first incidence of pain is constantly referred to the epigastrium. An acute attack of pain which begins in the right iliac fossa is, as I have said, rarely due to disease of the appendix; it is, indeed, only due to the appendix when previous attacks of inflammation have affected it.

Acute Pancreatitis.—This is often said to present great—indeed, insuperable—difficulties in diagnosis. But if the case is carefully studied and examined there need be no hesitation in reaching a definite discrimination between the two conditions. Deaver has said that the chief reason for failure to make a diagnosis of acute pancreatitis is that one does not “think of this disease” at the moment. It is certainly an infrequent condition; the perforation of a duodenal ulcer is common enough; and therefore, probability being the very guide of life, the perforation of an ulcer is at once in the forefront of one’s mind. There is much truth in this; for when the diagnosis of acute pancreatitis is made in a case discussed with others, it is often received with immediate assent. There should, however, be not the least difficulty in making an accurate diagnosis in the earliest stages.

Males are affected more frequently than females, in

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a proportion approximately of two to one. Females seem to be more susceptible in the early months of pregnancy. In acute pancreatitis the pain is even more horrible, of more prostrating and overpowering severity, than that which follows the bursting of an ulcer. It is, indeed, the most excruciating agony that the human body can suffer, and the very extremity of human endurance is reached. The pain begins in the epigastrium, extends over the whole abdomen, and pierces through to the back, and not seldom to the loins. Shock is present in profound degree from the very first. The patient, often obese, sometimes alcoholic, lies prostrate, faint and pallid, the pulse may be hardly perceptible, the limbs and face are cold, and death itself seems imminent. No such state is seen in any other form of casualty. There is all the collapse that even the greatest haemorrhage could cause, and more than the agony of a visceral rupture. Corroboration of a diagnosis made upon these evidences alone is hardly necessary; but if it were it is never lacking. Vomiting is almost invariably present, and it occurs early. There are cases in which it is repeated with great frequency and severity, so that the resemblance to a case of high intestinal obstruction, in respect of this one symptom only, is very close. The matters ejected are, however, never in the least like those seen when the jejunum is obstructed in its upper part; they are of gastric or of duodenal origin, never foul-smelling and never copious. Nausea and retching with hiccough are more frequent here than in cases where the intestine is blocked. The patient sometimes presents a very curious and, I believe, a quite characteristic appearance, to which Halsted was the first to call attention. The face is livid, and patches of slate-blue colour may be distributed irregularly over the surface of the abdomen, or even of the limbs. This cyanosis is never found in any other form of acute

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so often found: glycosuria, and a tenfold increase in diastase. Loewe's test is by no means constant, but when present is helpful: two or three drops of a 1/1000 solution of adrenaline are allowed to run slowly on to the conjunctiva of one eye; after a few minutes the dose is repeated. Within 20 or 30 minutes the pupil of the eye dilates.

The diagnosis of the more acute forms of pancreatitis and their differentiation from the cases of acute perforating ulcer should not be difficult if due regard is paid to the analysis of the symptoms, and if remembrance is given to the possibility of the involvement of the pancreas in cases which are hastily regarded as unduly severe examples of gastric or duodenal perforations.

Acute thoracic diseases.—These may cause the greatest difficulty in diagnosis; no surgeon of large experience is unfamiliar with that close mimicry of an acute abdominal catastrophe which is presented by such diseases as acute diaphragmatic pleurisy, acute pneumonia, and acute pericarditis, especially when they occur in young people. These diseases are often ushered in by acute pain which develops quickly, if not suddenly; and the pain, because of the involvement of the lower dorsal nerves which end in the abdominal wall, chiefly affects the parts involved when an ulcer has leaked. In such cases, too, there is often exquisite surface tenderness and restriction of movement of the abdominal muscles, or even at the first immobility, and a considerable degree of rigidity. All these may appear at a time when the pulmonary or cardiac condition is very slight, or even absent so far as gross physical signs are concerned.

Physicians do not perhaps always realize, as the surgeon in the war was made to realize, how great the disproportion may be between the physical signs in the chest and the conditions revealed when the chest is opened by operation. An early pneumonia or a patch of

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abdominal catastrophe, as far as I know; it is not always present in acute pancreatitis, but if it is found it is, I believe, an undeniable evidence of acute pancreatic disease. Grey Turner⁴ has recorded two cases in which large patches of discoloration of the skin were attributed to direct action of the pancreatic juice, which by infiltration had reached, in the one case the umbilicus, and in the other the costovertebral angle. I have seen a faint tinge of jaundice in five cases only.

The respirations are quickened in all cases, and are faint and shallow in proportion to the degree of collapse, which is in turn dependent upon the degree of swelling in and around the pancreas. An examination of the abdomen makes the diagnosis still more certain. There is a degree of rigidity in the whole abdomen, and the epigastric region is certainly a little firmer than the rest. But the fixity and hardness are not to be compared with the conditions present when a hollow viscus has burst. Then the rigidity is obdurate and unyielding, and immobility of all the abdominal muscles, including the diaphragm, is complete. The lightest handling is then resented. In acute inflammation of the pancreas, however, the rigidity and a degree of tenderness are confined to the parts above the umbilicus, and even in early hours a degree of fullness may be observed here. The whole abdomen is tender, but the tenderness is more acute above the umbilicus than below, and often is far more exquisite to the left of the middle line than to the right, a point not without significance.

If the patient survives a few days, as will happen in the less acute cases, the contrast between the upper protruding parts of the abdomen and the emptiness or even retraction of the lower parts may be very striking. This is the condition to which Fitz gave the name "epigastric peritonitis." In the less acute cases there may be time to recognize the urinary changes

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so often found: glycosuria, and a tenfold increase in diastase. Loewe's test is by no means constant, but when present is helpful: two or three drops of a 1/1000 solution of adrenaline are allowed to run slowly on to the conjunctiva of one eye; after a few minutes the dose is repeated. Within 20 or 30 minutes the pupil of the eye dilates.

The diagnosis of the more acute forms of pancreatitis and their differentiation from the cases of acute perforating ulcer should not be difficult if due regard is paid to the analysis of the symptoms, and if remembrance is given to the possibility of the involvement of the pancreas in cases which are hastily regarded as unduly severe examples of gastric or duodenal perforations.

Acute thoracic diseases.—These may cause the greatest difficulty in diagnosis; no surgeon of large experience is unfamiliar with that close mimicry of an acute abdominal catastrophe which is presented by such diseases as acute diaphragmatic pleurisy, acute pneumonia, and acute pericarditis, especially when they occur in young people. These diseases are often ushered in by acute pain which develops quickly, if not suddenly; and the pain, because of the involvement of the lower dorsal nerves which end in the abdominal wall, chiefly affects the parts involved when an ulcer has leaked. In such cases, too, there is often exquisite surface tenderness and restriction of movement of the abdominal muscles, or even at the first immobility, and a considerable degree of rigidity. All these may appear at a time when the pulmonary or cardiac condition is very slight, or even absent so far as gross physical signs are concerned.

Physicians do not perhaps always realize, as the surgeon in the war was made to realize, how great the disproportion may be between the physical signs in the chest and the conditions revealed when the chest is opened by operation. An early pneumonia or a patch of

pleurisy on the diaphragm and lung opposed to it, may be almost impossible, even quite impossible, to discover at a time when the question as to whether or not a surgical calamity has occurred must be discussed. And the decision to be reached may involve the patient's life. For if a perforation of an ulcer is not closed, death will overtake the patient in a day or two; and if an anaesthetic is given when serious thoracic disease is ingeminating, the gravest harm may be done. It is only by earnest consideration of certain points that a discrimination may be possible:—

(a) The examination of the abdomen by the practised hand will disclose the fact that, though tenderness and rigidity are both present, they are not by any means so striking as in cases of perforation. Surface tenderness may be exquisite and a gentle pinching of the skin almost intolerable; yet deep, firm, but still gentle pressure will be a comfort to the patient. Neither rigidity nor tenderness is universal; a little relaxation of the abdominal wall may be found in the hypogastrium or in the iliac regions, especially at the end of each expiration, and here, too, cutaneous sensitiveness is less acute. Rectal examination discloses no tenderness of the pelvic peritoneum. Indeed, as a rule, a continued observation will be convincing as to the greater implication of the upper as compared with the lower parts of the abdomen.

(b) The temperature is nearly always raised, perhaps by 2, 3 or 4 degrees in thoracic conditions; it is depressed when an abdominal disaster has recently occurred. In some pulmonary diseases the initial or an early symptom may be rigor, and within a short time the sensitive swollen edge of the lip may indicate that herpes is developing.

(c) The respiratory frequency is accelerated out of all proportion to the pulse-rate. There may be 40 respirations or even more to the minute, while the pulse-rate

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remains near or even below 90. The ratio of pulse to respiration is normally about 40 to 10. If it is 30 or 25 to 10 then the cause usually lies above the diaphragm, and not in the abdomen. This change in the ratio is the most significant of all signs, and in all cases the closest regard must be paid to it.

Acute Appendicitis.—The differential diagnosis between acute appendicitis and the perforation of an ulcer may sometimes present difficulty. This is more especially the case towards the end of the period of reaction. The tendency for fluids which escape from the rupture of an ulcer in the duodenum, or in the stomach near the pylorus, is to be deflected by the little hillock in the transverse mesocolon and to flow down the outer side of the ascending colon into the right iliac fossa. That fossa being filled, the fluid runs into the pelvis. As it follows this track it excites a peritoneal response; it is an acrid and irritating fluid, and peritonitis results from its corrosive, no less than its bacterial action. The right side of the abdomen will, therefore, be more painful, more tender, more resistant. In the less acute cases, therefore, in the period of reaction, the inflammatory conditions are apt to resemble those of an acute appendicitis with spreading peritonitis. The lymphatic areas of the right side of the abdomen are a part of the plexus which includes also the vessels of the appendix, and an acute, widespread lymphangitis results when there is an acute inflammation of the appendix falling short of perforation.

Both the clinical history and the physical signs, however, should enable an accurate differential diagnosis to be made. In acute appendicitis the onset of pain is never so severe, never overwhelms a patient with its unendurable intensity; it is never quite so sudden, but reaches its greatest height an hour or two, or even more, after the first pangs are noticed. The perforation of an appendix certainly causes a sudden and an exceedingly

pleurisy on the diaphragm and lung opposed to it, may be almost impossible, even quite impossible, to discover at a time when the question as to whether or not a surgical calamity has occurred must be discussed. And the decision to be reached may involve the patient's life. For if a perforation of an ulcer is not closed, death will overtake the patient in a day or two; and if an anaesthetic is given when serious thoracic disease is ingeminating, the gravest harm may be done. It is only by earnest consideration of certain points that a discrimination may be possible:—

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are pressed to his abdomen, and he welcomes the strong pressure of another hand. There is never any universal abdominal rigidity. There is local stiffness, and the abdominal muscles are tightened in the effort of groaning, but there is not the slightest evidence of general involuntary rigidity. The pictures of the two sufferers are so completely different that it is impossible to suppose that the difficulties in diagnosis can exist for those who have seen the states produced by these two catastrophes.

In *biliary colic* the pain beginning in the epigastrium veers to the right side, and pierces through to the shoulder blade. The pain comes with instantaneous suddenness, and may leave with equal abruptness. A patient may be rolling in agony one instant, and smiling in happy relief the next. The change is incredibly swift when the stone is released from the cystic duct.

In *renal colic* the pain begins in the back, soon is reflected to the front of the abdomen, and shoots to the testis, to the groin and to the inner and upper part of the thigh. There is often an urgent, frequent and ineffective desire to urinate.

On the other hand, *intestinal colic* due to foods unsuited to the individual or to ptomaine poisoning are not localized to any part, but rather affect the whole abdomen; there is no localizing tenderness or resistance, nor any distinguishing cutaneous hyperesthesia. Restlessness, the relief from pressure, the absence of tense, inflexible and universal abdominal rigidity make the differential diagnosis quite indisputable.

Severe *lead colic* may present more difficulty, as it is the only form of colic in which a definite rigidity and tenderness occur over the whole abdomen; the patient lies perfectly still and resents the slightest pressure on his abdomen. A history of contact with lead and a blue line on the gums would suggest the possibility

severe pain, even an agony; but perforation is the consequence of some added factor in an already inflamed appendix which has declared its infection by signs and symptoms which should easily be recognized. The rule, with few exceptions, if any, is that the perforation of an appendix follows the administration of aperients given because of the abdominal discomforts caused by the inflammation of the appendix. Without aperients there is never perforation.

In all cases of acute appendicitis there is an elevation of temperature; slight perhaps and fugitive, but always to be observed if accurate and continuous observation be made. Both vomiting and diarrhoea are common in the early stages. Local tenderness, rigidity, cutaneous hyperæsthesia and swelling suggesting a phlegmonous inflammation, are all likely to be noticed and to make a diagnosis unequivocal. Examination of the rectum reveals tenderness, especially in those cases where the appendix hangs over the brim of the pelvis; and the infection of the pelvic peritoneum causes irritability of the bladder, with pain at the end of micturition, and may lead to an infection of the urine by the *Bacillus coli*. The leucocyte count is raised.

Abdominal Colic.—An attack of abdominal colic—biliary, renal or intestinal—is often believed to present difficulties of differential diagnosis. There should be none. An attack of colic comes with equal suddenness, but it excites not immobility but agitation and infinite restlessness. A patient struck down by the perforation of an ulcer is motionless; his body is intensely rigid, every active movement is avoided, and every passive movement bitterly resented. Even every act of inspiration is shortened, so as to avoid any slightest abdominal movement. A patient in the agony of colic can find no resting-place. He writhes and groans, and moves about or rolls on the bed or floor in search of the comfortable position he never finds. His arms

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unaffected. The history and these physical signs leave, as a rule, no doubt as to the nature of the calamity. Other forms of haemorrhage, traumatic in origin, do not present any difficulty. "Ballance's sign," the slow change of position of the area of dullness on percussion due to extravasated blood, is often clearly elicited.

Intestinal Obstruction.—Various forms of intestinal obstruction sometimes cause symptoms not widely diverging from those of perforation. There is the same sudden onset of pain, and the same implication of the whole abdomen in the response; there are vomiting, prostration, slowly advancing distension; there is absolute cessation of voluntary intestinal discharge, of flatus as of faeces. But there is not the same fierce intensity of the symptoms in any form of intestinal obstruction except one, volvulus. And in this, as in all others, the abdominal rigidity does not approach the metal-like fixity and immobility seen in cases of perforation; nor is the pain so agonizing. There is in obstruction an immediate onset of vomiting and this symptom persists and is uncontrollable. Small quantities are ejected frequently, indicating that the stomach is already over-distended, and is continually being filled, no matter how quickly it endeavours to empty itself. The ejected matters are gastric, then duodenal or jejunal, brown, offensive, and bitter. "Faecal" vomiting is seen only in cases of gastro-colic fistula, or a few moments before the agony of death. The term "faecal vomiting," indeed, should disappear from the vocabulary of intestinal obstruction.

Mesenteric Embolism or Thrombosis.—A condition, happily infrequent, which may give for perhaps a few hours at the onset as close a resemblance as any other to acute perforation of the stomach is mesenteric embolism or thrombosis. There is the same sudden onset of acute intolerable pain; the same

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of lead poisoning, but the diagnosis can be rejected with confidence unless examination of a blood-film proves the presence of punctate basophilia. This indicates a state of acute lead intoxication which alone could give rise to a degree of colic sufficient to simulate an abdominal catastrophe.

Profuse Haemorrhage.—There are occasions when profuse haemorrhage associated with severe pain may produce a condition requiring to be distinguished from that of perforation. Of these the most common and the most serious is concerned with the rupture of a tubal gestation. There is the same sudden onset of acute abdominal pain, the same immediate prostration, the same acute anxiety for the patient's life. Beyond these there is little resemblance. Blood which escapes, sometimes in very large quantities, into the abdominal cavity is little irritating, one is tempted to say in no degree irritating, to the peritoneum. Its entry is not resented and accordingly does not cause the same extreme response either viscero-motor or viscero-sensory as is made by irritating gastric or intestinal contents. There is therefore not the same agonizing pain, nor is there the same incoercible abdominal rigidity. This catastrophe occurs, as a rule, after one menstrual period has been missed. A sudden severe pain, not of the same prostrating severity as in rupture of an ulcer, but, nevertheless, very acute, is noticed almost at the same moment that a vaginal loss of blood occurs. The pain continues, and soon the signs of internal haemorrhage are observed. These are pallor, faintness, rising pulse-rate, decreasing blood-pressure, air hunger, restlessness and so forth. The patient's anxious, sweating face tells of suffering and apprehension. The abdomen is soft, perhaps a little full and a little doughy, especially in the lower half, and perhaps on one side rather than on the other; the respiratory movement in it, always slight, is

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prostration, some degree of abdominal rigidity, and a quickly-developing distension of the whole abdomen. But the pain soon becomes intermittent, and is spoken of as "cramp"; blood appears in the stools, sometimes within an hour or two. The patient becomes profoundly collapsed, the pulse-rate rises rapidly, the temperature falls. There is often, though not invariably, an obvious source from which an embolus might be derived, vegetative lesions on the left side of the heart being the commonest. The cases may be divided into two groups: the acute and the chronic.

In the *acute* cases the symptoms are ushered in with absolute abruptness at a time when the patient is in good health. The patient is, as a rule, of middle age, inclined to obesity, and may present evidences of chronic valvular disease of the heart or of early arteriosclerosis: an operation may recently have been performed. There is a sudden, intense, abdominal pain, at first colicky in character, later becoming almost unremitting, which is speedily followed by nausea, vomiting, and perhaps collapse. There may be diarrhoea or constipation; if the former, the motions are frequent and blood-stained; if the latter, obstruction is absolute, neither flatus nor faeces being passed. In both the abdomen becomes distended, rigid and tender. There are occasionally the signs of free fluid in the peritoneum. The general condition of the patient is poor from the first and rapidly becomes worse. The temperature is often sub-normal. The pulse is always rapid, and its quality is bad. Blood-stained motions are found in 41 per cent. of the cases, but even when no obvious blood has been passed, the intestinal contents are always found to be deeply blood-stained.

The second, smaller, *chronic* group is formed by cases of quiet, insidious origin, with a prolonged and varying course. Jackson and others have shown that

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the belief that the acute cases were dependent upon embolism and the chronic upon thrombosis is fallacious. In the series of cases collected by Jackson, Porter and Quinby⁵ there were 7 marked chronic cases dependent upon thrombosis and 7 dependent upon embolism. The cases are almost twice as common in men as in women, and the majority are found between the ages of thirty and sixty years.

There is always the greatest doubt as to the nature of the illness from which the patient suffers. A diagnosis of intestinal obstruction is generally made, and it is only at the operation or at an autopsy that the exact condition of affairs is revealed. A previous history, perhaps a protracted history of gastric discomfort, is sometimes given. It is an evidence, no doubt, of arterio-sclerosis affecting the vessels within the abdomen. In these cases the mimicry of such organic diseases as gastric or duodenal ulcer, or cholelithiasis may be very accurate. In all cases the greater suffering caused by heavy meals as compared with the less suffering after light meals is most significant. It is only within an hour or two of the onset of the acute cases that any doubt in diagnosis should exist. And even in this period there is never the same intense and unyielding abdominal rigidity as is invariable in cases of perforation.

Tabes Dorsalis Crises.—There is only one matter remaining for discussion. It concerns the mimicry of these cases of abdominal catastrophe by the "crises" dependent upon tabes dorsalis. No case of abdominal disease, acute or chronic, is adequately examined unless the pupillary reactions and the ankle and knee jerks are observed. Gastric crises may cause symptoms which are mistakenly attributed to organic diseases of the abdominal viscera; and such lesions as gastric or duodenal ulcer, cholelithiasis, renal calculus, appendicitis have all been diagnosed, and operation performed

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clinical diagnosis.

OPERATIVE TREATMENT.

The technical details in connection with the various operations will be found in other works concerned with the craft of surgery. I propose here to discuss only their applications and results. When a perforation has occurred there are obviously two methods of dealing with the gap in the stomach or duodenum. The opening may be closed; or it may be used for the insertion of a tube. The results of surgery, given adequate competence in the operator, depend almost entirely upon the time that has elapsed after perforation.

If the operation be performed early and the conditions are favourable the rent in the viscus is closed. If this closure brings about an immediate stenosis, or appears to threaten or ensure stenosis in the future, the question of the performance of a short-circuiting operation will arise. Alternatively, the rent in the viscus may be enlarged, the ulcer excised, and the incision so sutured as at once to enlarge the calibre of the viscus at the part implicated.

If the operation be performed late—if it is a rescue operation rather than a reparative operation—then the opening in the base of the ulcer may be used for the introduction of a tube, rapidly fixed in position, and employed for days after as a means of introducing fluid food to sustain an almost exhausted or nearly moribund patient. A drain into an overloaded peritoneal cavity is rapidly introduced above the pubes, but time will not allow of more than this.

There is an increasing tendency on the part of most surgeons, I think, to deal, if possible, reparatively with a lesion in the duodenum. The whole ulcer together with the gap in or near its centre is excised, and the resulting opening, perhaps of large size, is so

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in cases of tabes dorsalis. In a paper entitled "Gastro-enterostomy and after,"⁶ I related cases of these diseases in which this operation was so performed; and every surgeon of large practice in abdominal surgery is perhaps familiar with this most grievous error. On the other hand, cases of ulcer have been diagnosed as suffering from tabes. It is to be remembered that the sensitiveness of the abdominal organs, and the rapidity and acuteness of both the viscero-motor and the viscero-sensory reflexes are less in cases of tabes than in normal individuals. An abdominal catastrophe may occur in a tabetic. The danger of overlooking it, and of ascribing the symptoms to a gastric crisis, is a very real one. I have once been confronted by this difficulty ; but happily the symptoms, though reduced in intensity in comparison with those seen in normal individuals, were still so extreme as to necessitate immediate operation.

Conclusion.—The conclusion from this discussion is clear. The diagnosis of an abdominal calamity requiring immediate surgical treatment is made when a sudden attack of prostrating and overwhelming agony is associated with an obdurate, unyielding rigidity of an abdominal wall which is everywhere excessively tender and immobile. Shock in the strict surgical meaning is not present. If we wait for it, we are risking the patient's life : for it is not an evidence of perforation, but of the peritonitis which is preventable, and should be prevented. We may not be able to say, when these signs alone are present, that the catastrophe is certainly in one viscus, or certainly in another. It matters little where it is, all we need to know is that wherever it is, and whatever it is, it is irremediable except by surgery. We must reduce this matter to simple terms and that is the only method by which we can succeed. The salvation of a human life is a greater thing than the establishment of a convincing irrefutable

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Summary of all cases of perforated ulcer (1920-1925 inclusive) in which data required are available.

PERFORATED GASTRIC ULCER.

Operation performed.	Under 12 hours.		12 to 24 hours.		Over 24 hours.	
	Cured	Died	Cured	Died	Cured	Died
Suture only	10	1	—	—	—	—
Suture with drainage ..	3	—	—	1	—	2
Suture with gastro-ent. ..	1	—	—	—	—	—
Suture with gastro-ent. and drainage ..	2	—	—	—	—	—
Suture with jejunostomy ..	2	2	—	—	—	—
Suture with jejunostomy and drainage ..	—	1	1	—	—	—
Total for all forms of operation	18	4	1	1	—	2

PERFORATED DUODENAL ULCER.

Operation performed.	Under 12 hours.		12 to 24 hours.		Over 24 hours.	
	Cured	Died	Cured	Died	Cured	Died
Drainage only	—	—	—	—	—	—
Suture	34	9	3	—	1	1
Suture with drainage ..	9	7	7	10	—	6
Suture with gastro-ent. ..	71	7	4	2	—	—
Suture with gastro-ent. and drainage ..	13	3	—	1	—	—
Suture with gastro-duodenal and drainage ..	—	—	—	1	—	—
Excision with pyloroplasty	21	1	—	—	—	—
Total for all forms of operation	148	27	14	14	1	7

MORTALITY RATES.

Operation.	Under 12 hours.	12 to 24 hours.	Over 24 hours.	Total.
Perforated gastric ulcers	18·18%	50%	100%	26·92%
Perforated duodenal ulcers	15·43%	50%	88·88%	23·11%

The cases tabulated were operated upon by various members of the staff and by senior resident officers. Individual surgeons are able to show more favourable results.

By the courtesy of Mr. Grey Turner I am able to publish the following table from his own practice:—

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sutured that not only is a stenosis avoided, but a larger calibre of the intestine results. These methods are based upon the old "pyloroplasty" introduced by Heineke and Mikulicz, and changed in scope and greatly improved in respect of results by Finney and, finally, by C. H. Mayo.

The older methods of simple closure of the ulcer lying near the pylorus, on one side or on the other, were found not seldom to cause a degree of stenosis which called for a second operation in a few months' or in a few years' time. The suggestion that the short-circuiting operation should be performed at the time of closure of the perforation was first urged by me in 1901.⁷ Individual experiences vary as to the frequency with which secondary operations are needed: as to the mortality attributable to the added procedure, immediate gastro-enterostomy, and as to the quality of the immediate convalescence of the patient so treated. But the wisest opinions seem to have steadily drifted towards a recognition of the need of some procedure to counteract, or to control stenosis, in a large proportion of cases of duodenal rupture.

When the perforation lies in the stomach the same problem does not arise, unless the ulcer has lain close to the pylorus. If the lesser curvature, or any part of the stomach away from the pylorus is implicated, then it seems quite certain, from universal experience, that though recurrence of the ulcer may take place, a degree of stenosis calling for relief is extremely rare.

In order to indicate the methods used and the results which follow, I have asked Mr. W. H. Symons, Assistant Surgeon at the Leeds General Infirmary, to prepare the following table, which shows the results of six years' continuous work in a large general hospital. The mortality was heaviest in the early years. In the last year the mortality of all cases of perforated duodenal ulcer was 10 per cent.

ULCER PERFORATION.

Summary of all cases of perforated ulcer (1920-1925 inclusive) in which data required are available.

PERFORATED GASTRIC ULCER.

Operation performed.	Under 12 hours.		12 to 24 hours.		Over 24 hours.	
	Cured	Died	Cured	Died	Cured	Died
Suture only	10	1	—	—	—	—
Suture with drainage ..	3	—	—	1	—	2
Suture with gastro-ent.	1	—	—	—	—	—
Suture with gastro-ent. and drainage	2	—	—	—	—	—
Suture with jejunostomy ..	2	2	—	—	—	—
Suture with jejunostomy and drainage	—	1	1	—	—	—
Total for all forms of operation	18	4	1	1	—	2

PERFORATED DUODENAL ULCER.

Operation performed.	Under 12 hours.		12 to 24 hours.		Over 24 hours.	
	Cured	Died	Cured	Died	Cured	Died
Drainage only	—	—	—	—	—	—
Suture	34	9	3	—	1	1
Suture with drainage ..	9	7	7	10	—	6
Suture with gastro-ent.	71	7	4	2	—	—
Suture with gastro-ent. and drainage	13	3	—	1	—	—
Suture with gastro-duo- den and drainage ..	—	—	—	1	—	—
Excision with pyloro- plasty	21	1	—	—	—	—
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Summary of cases, excluding localized perforations, incomplete operations, and cases not operated upon (to end of 1924).

PERFORATED GASTRIC AND DUODENAL ULCERS.

No. of hours of Perforation.	Total No.	Recoveries.	Deaths.	Percentage of Death.
In 8-hour periods.				
Up to 6.. ..	35	34	1	2·85
7 to 12.. ..	63	56	7	11·11
13 to 18.. ..	20	16	4	20
19 to 24.. ..	15	10	5	33·33
Over 24.. ..	14	8	6	42·85
Grand Total ..	147	124	23	15·64

All cases operated upon within 12 hours. Total, 98, with 8 deaths: 8·16 per cent.

These conclusions, therefore, may be drawn:—

1. In gastric ulcers affecting the stomach, in parts other than the pyloric antrum, the closure of the perforation is all that is required. If the patient is in a later stage of the catastrophe, or if the gap is inordinately large, the opening in the stomach may be used for the introduction of a tube; that is the performance of a temporary gastrostomy.

2. In duodenal ulcers, where the rent is small and surrounding induration absent or of very limited extent, closure of the perforation is all that is required.

3. In duodenal ulcer where the rent is larger and induration more extensive, one of two courses may be followed:—

(a) The ulcer may be infolded and gastro-enterostomy or gastro-duodenostomy performed.

(b) The rent may be enlarged, the ulcer excised, and a plastic operation which secures an enlargement of the passage from the stomach may be performed.

4. In duodenal ulcer, where the gap is very large and induration excessive, one of two courses may be followed:—

(a) The ulcer may be closed as much as possible,

ULCER PERFORATION

and the gap filled by a plug of omentum, gastro-enterostomy being performed.

(b) The opening may be used for the performance of temporary duodenostomy.

The two methods are both unsatisfactory and are only to be used in the last stage of the emergency.

The questions of irrigation and of drainage are decided by the extent and quality of the peritoneal contamination or infection.

COMPLICATIONS.

Various complications may follow the operation performed; and may indeed prove to be the most serious factor of the illness. They are more prone to follow late rather than early operations: but no operations, however early, however skilfully performed, by whatever method, are exempt. A review of our cases over many years shows that approximately one operation in six will suffer from some embarrassing sequel, which may involve a very protracted convalescence, or be responsible for the death of the patient at a date remote from the original catastrophe. Grey Turner's experience coincides with our own. In 147 cases he found 23 in which serious complications developed.

1. *Subphrenic Abscess*.—This is perhaps the most serious of all. It is due to an extension of the contamination or infection which spread from the site of perforation in consequence of the extravasation of the contents of the stomach or duodenum. It is slightly more common on the left side in cases of gastric ulcer; on the right side in cases of duodenal ulcer; but each variety of ulcer may cause an abscess upon either side. The evidences of its development do not, as a rule, begin until after the fifth day: by the tenth day they are usually definite. From this time their severity increases rapidly unless relief is given.

2. *Residual Abscess*.—The material extravasated

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2. *Residual Abscess*.—The material extravasated

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from the ulcer, together with the fluid poured out freely from the peritoneum, may collect in small or large amounts in various parts of the abdominal cavity. In consequence of adhesions which so quickly form, some fluid may be shut off, increase in quantity, and because of the infection rarely virulent, but never absent, result in the formation of an abscess. Gravity decides that the pelvis shall be most frequently the site of such a collection; if the patient has lain supine, one or other or both renal pouches may be filled, or the iliac fossa, generally on the right side, may hold an abscess which closely resembles that arising from a diseased appendix.

The signs which result depend therefore upon the position taken by the collection of fluid. If the pelvis is filled, a swelling recognized most easily, and in an earlier stage, by rectal examination will develop. An absence of mucus in the stools for a few days is the signal that proctitis is present; and the rectum must then be examined. The finger impinges upon a tense, doughy swelling which feels as though a tennis ball were impacted deep in the pelvis. Day by day this bulging of the anterior wall of the rectum will increase; and if there is no urgency may be allowed to increase until it is evident that a quite definitely circumscribed abscess is present. Then a small opening made by one thrust of the sharp end of a pair of scissors will open the abscess, and its contents will soon drain away. Rectal drainage is far preferable to abdominal drainage, and is effected more easily than vaginal drainage. If the abscess is to develop in one of the other sites a doughy swelling will form, become by degrees firmer, and more sharply delimited, and show the clear evidences of a pointing abscess.

The symptoms are the same in all cases: a little pain localized in the affected area, a little fever, an absence of the progress that the patient may be

ULCER PERFORATION

expected to make at this stage, as shown by languor, continuing prostration, quick weariness after slight effort, lack of desire for food, furred tongue, and the like. Our suspicions are perhaps aroused, and some anxiety created, before we are able to recognize exactly where the complication is about to develop. We must then examine, by routine, the chest, the abdomen, the flanks, the rectum, until our fears are confirmed, or happily shown to be groundless.

3. *Parotitis*.—This is among the most serious of all the complications which may follow after this operation. We now recognize that it is due to an infection extending up Stenson's duct, from a mouth which has not been kept clean. In the early days, after an operation of this kind, it may be inadvisable to give food. This is perhaps more likely to be the case if the perforation has merely been closed, without the performance of gastro-enterostomy, or of gastro-duodenostomy. After these operations fluid food may be given freely and at once, and semi-solid food in a few days' time. If these operations have not been performed, there may be a fear of the suture line giving way if even fluid foods are given. Not the least convincing of the arguments urged in favour of the short-circuiting operations is that the convalescence afterwards is both safer and quicker; and that such a complication as parotitis is less likely to occur. The prevention of parotitis is a question of careful nursing. It is a tedious matter, no doubt, to have to attend hourly to the toilet of a patient's mouth, clearing away impurities and lodgments, and keeping the mucous membrane moist. But it must be done. The patient must help by flushing the mouth almost incessantly with some agreeable, fragrant, slightly antiseptic fluid; and he may keep his saliva flowing by the use of chewing gum. A dry mouth is not only a discomfort, it is a real danger.

4. *Pulmonary Complications*.—These are of many

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Tests for Drunkenness.

BY SIR JAMES PURVES-STEWART, K.C.M.G., C.B.,
M.D., F.R.C.P.

Senior Physician to Westminster Hospital, etc.

THE following article, which has been contributed to THE PRACTITIONER at the request of the Controlling Editor, is founded—although there are some important emendations—upon an address which I delivered before the Society for the Study of Inebriety, where it gave rise to considerable discussion. The subject is one of serious importance to medical practitioners, who may have to deal with cases of supposed alcoholic intoxication.

According to Byrne's "Law Dictionary," no statutory definition of drunkenness exists, and "A man may be held drunk for the purpose of one offence when he would not be held drunk for the purpose of another offence. The degree of intoxication which would make an engine-driver drunk if he were driving an express train would not make him drunk if he were walking along a country lane." Mr. Serjeant Stephen, in his "Commentaries on the Laws of England," defines drunkenness as "That which deprives men of their reason and occasions in them an artificial madness or phrenzy while it lasts." We medical practitioners have to be more precise. Therefore, with all deference to the various legal and medical authorities, I would submit the following definition for consideration :

A drunk person is one who has taken alcohol in sufficient quantity to poison his central nervous system, producing a temporary disorder of his faculties so as to render him unable to execute the occupation on which he was engaged at the time, thereby causing danger to himself or to others.

In this definition two classes of transient disability

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kinds. Diaphragmatic pleurisy, empyema, basal pneumonia and pulmonary embolism have all been observed. Infection spreading through the diaphragm is responsible in some cases; and inhalation of vomited material during the operation in others. The emboli which lodge in the lung are derived sometimes from the larger abdominal veins, the internal or the external or the common iliac (never, of course, from the veins of the portal system), in which cases as a rule death occurs with great rapidity and the pulmonary artery is found completely blocked: or from the small vessels in the anterior abdominal wall, in which case there is an infarct in the lung. A sharp and sudden attack of pain is due to a local consolidation of the lung with a pleuritis over its surface; and there is a cough with a characteristic blood-stained sputum. A series of emboli following each other at a few days' interval may occur. There is rarely, however, any anxiety as to the patient's recovery.

5. *Gastric or Duodenal Fistula*.—This may follow the giving way of the suture which has temporarily closed the base of the ulcer, or may be due to leakage occurring after removal of the tube inserted into the stomach or duodenum through the rent. It is always an extremely serious complication, and in duodenal cases is almost invariably fatal. When the stomach is involved a reparative operation may succeed. If the duodenum is involved it will probably be necessary to close the pylorus and to perform gastro-enterostomy.

References.

- ¹ Sherren, *Lancet*, 1924, i, 477.
- ² Walton, *ibid.*, 1922, ii, 269.
- ³ Moynihan, *ibid.*, 1909, ii, 1656.
- ⁴ Grey Turner, *Brit. Jour. Surgery*, 1919, vii, 394.
- ⁵ Jackson, Porter and Quinby, *Jour. Amer. Med. Assoc.*, 1904, xlvi, 1469.
- ⁶ Moynihan, *Brit. Med. Jour.*, 1908, i, 1092.
- ⁷ Moynihan, *Lancet*, 1901, ii, 1662.

TESTS FOR DRUNKENNESS

the protective barrier of mucus from the gastric mucous membrane, thereby rendering the residue of alcohol which remains in the stomach more readily absorbed than before.

Fatigue and excitement may be factors in predisposing to rapid alcoholic intoxication. A sudden fall in atmospheric temperature may also precipitate intoxication. The most rapid method of alcoholic intoxication of which, I know is by means of intravascular injection. This is, of course, an accidental and very exceptional affair, never self-induced by the patient.

I can quote, however, the case of a young man in whom I was injecting absolute alcohol into the stylo-mastoid foramen, for the purpose of inducing temporary facial palsy to relieve facial hemispasm. During the operation he suddenly moved his head, and consequently some of the alcohol was accidentally injected into the internal carotid artery, conveying it directly to the brain. Within a few seconds symptoms of acute alcoholic intoxication supervened, with mental confusion, singing, shouting and fighting; these phenomena disappeared completely after a few minutes.

SO-CALLED TESTS FOR DRUNKENNESS.

The practical problem which has to be solved daily is whether a given individual is drunk or not. The diagnosis is often so easy that it is arrived at by non-medical observers. As a matter of fact, in most cases the diagnosis is made by a policeman, who has then to decide whether to take the person into custody, for the safety of the drunken man himself or for that of his fellow-citizens. At the police-station the police officer's diagnosis is confirmed or otherwise by the police surgeon. Police surgeons vary considerably in their temperament and in their susceptibility to the dogmatic suggestions of drunkenness propounded by police constables; but here I would like to make it perfectly clear that in nine cases out of ten the policeman's diagnosis is correct.

Upon the subject of so-called tests for drunkenness a good deal of loose thinking has been going on. With

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are referred to. One, the intoxicated person's personal incapacity, is mainly a medical problem; the other, in the final phrase, has to do with the relations of the drunk man to his fellow-citizens and is a medico-legal affair.

In the eyes of the law a prisoner is liable to punishment not for being merely drunk, but for the combined offences of being drunk and disorderly, drunk and incapable, drunk and unfit to drive a motor-car and so on. I am not aware that there is now any penalty for being drunk, so long as the drunkenness does not inflict harm or risk on other people.

Alcoholic intoxication takes place when the quantity of alcohol absorbed becomes enough to poison the central nervous system, and to disturb the person's normal reactions to his surroundings. The total amount of alcohol necessary to produce nervous symptoms varies widely in different cases. Habituation or acquired tolerance to the drug is one factor; the seasoned toper may consume large and increasing quantities daily for many years and may never show any symptoms of drunkenness, whereas a moderate drinker, or still more an habitual teetotaller, will become acutely drunk if he attempts to keep up with him for an hour. The degree of concentration of the alcohol is another factor so self-evident as to require no further discussion. The majority of cases of alcoholic intoxication nowadays are due to spirit drinking; in only a small proportion is it attributable to light wines or beer.

Another factor is the relation between drinking alcohol and the taking of food. Alcohol swallowed before or between meals—unmixed with food—is more rapidly absorbed than when taken with or immediately after food. Sometimes the vomiting of alcohol, or of a mixture of food and strong alcohol, instead of preventing the person from becoming drunk, may actually precipitate the symptoms of acute intoxication. This is due to removal, during the act of vomiting, of

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The practical problem which has to be solved daily is whether a given individual is drunk or not. The diagnosis is often so easy that it is arrived at by non-medical observers. As a matter of fact, in most cases the diagnosis is made by a policeman, who has then to decide whether to take the person into custody, for the safety of the drunken man himself or for that of his fellow-citizens. At the police-station the police officer's diagnosis is confirmed or otherwise by the police surgeon. Police surgeons vary considerably in their temperament and in their susceptibility to the dogmatic suggestions of drunkenness propounded by police constables; but here I would like to make it perfectly clear that in nine cases out of ten the policeman's diagnosis is correct.

Upon the subject of so-called tests for drunkenness a good deal of loose thinking has been going on. With

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the possible exception of a positive reaction for alcohol in the cerebro-spinal fluid, to which I shall refer later, there is no single clinical sign which is pathognomonic of alcoholic poisoning of the central nervous system. This is because drunkenness is not a simple clinical entity like a broken bone or a consolidated lung, but a disorder of behaviour, evidenced by a whole series of transient phenomena following an initial poisoning.

First, we have always to ask ourselves : "Has the person recently taken alcohol ?" If he has not, we need proceed no farther. If we smell alcohol in his breath, or even demonstrate it chemically in the expired air, this is *prima facie* evidence of the possibility of alcohol poisoning, but no more than a possibility. We must remember that alcoholic intoxication is constituted, not by excess of alcohol in the stomach, but by poisoning of the central nervous system. It is incidentally important that the observer who claims to recognize the smell of alcohol in others, whether he be police officer or police surgeon, shall himself be free from recent alcoholic consumption.

Secondly, has he taken alcohol in such quantity as to produce disorder of the central nervous system and to render his reactions to the outer world temporarily abnormal ? This is where the various so-called tests for drunkenness come in. It must be remembered that these are not tests for alcoholic poisoning itself, but only for cerebral, cerebellar, ponto-bulbar or other disorders. Such disorders may be due to alcoholic intoxication, but they may also be produced by various other causes.

Take, for example, the common case, where a policeman arrests a man for being drunk and incapable in a public place. When asked in the witness-box what was the condition of the accused, the constable usually replies, confidently and dogmatically, "He was drunk." If pressed by the court or by the defending counsel to say how he knew that the accused

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was drunk, he generally says: "He smelt of drink; he was disorderly in his conduct; he spoke indistinctly; and he staggered in walking." Such facts as these are certainly strong presumptive evidence of drunkenness. But, being human, even a policeman may be mistaken, for, apart from the smell of alcohol, every one of the foregoing evidences of drunkenness may be found in certain persons who are perfectly sober. As examples of what I mean, it is easy to understand how an individual with the unsteady gait of locomotor ataxia or of cerebellar or labyrinthine disease, or a patient with dysarthria from bulbar palsy, palatal deficiency, or even with a stammer, or another who is nervous, or angry, or otherwise emotionally excited from perfectly legitimate cause, say after a street accident, may quite innocently be charged with being drunk.

How are we to avoid such errors? Sometimes by obtaining evidence as to the presence of these disabilities before the onset of the alleged intoxication, and in any case by examining him after the supposed drunkenness has had time to pass away when, if he is suffering from a gross organic lesion, he will still be found to display the same clinical disorders, with the exception that the alcoholic aroma has now faded from his breath.

Some time ago a medical colleague, who suffers from a large perforation of the palate, complicated by chronic Eustachian catarrh and frequent labyrinthine vertigo, was driving his motor-car when he had to swerve to avoid someone at a street corner. His car ran on to the side path, bruising the legs of a bystander. As bad luck would have it, he had recently had a glass of gin and vermouth. The police constable, noticing his alcoholic breath and observing his unsteady gait and indistinct articulation, promptly, and quite reasonably, arrested him. He was accused, and convicted, of being drunk in charge of a motor-car. Only on appeal was he able to establish the facts of his chronic palatal deficiency with recurrent labyrinthine vertigo and to secure acquittal on the charge of drunkenness.

In my opinion the court should, in doubtful cases, insist on a second examination being carried out more

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frequently than it does at present—which, in fact, is almost never.

TESTS COMMONLY EMPLOYED.

In considering some of the commoner clinical phenomena employed by medical practitioners as tests in the recognition of drunkenness at a given moment, I must emphasize the fact that these are not in themselves tests for alcoholic poisoning, but merely for cerebral, cerebellar or ponto-bulbar disorders, as the case may be. Further, no single test, taken by itself, is conclusive evidence of drunkenness.

Disorder of the Higher Cerebral Centres.—This may be evidenced by the presence of mental confusion, incoherence of thought and speech, emotional excitement on the one hand or apathy on the other. An especially useful test is to ask the patient what time he thinks it is. A drunken person is often wildly inaccurate in his estimation. Sensation may also be disordered so that the patient is relatively insensitive to stimuli, especially painful stimuli, and may cut, bruise, or otherwise injure himself without noticing it. Such cerebral phenomena, when transient, of recent origin, and associated with a recent dose of alcohol, are strong presumptive evidence of drunkenness. But we have to bear in mind the possibility that the patient may be habitually emotional or excitable, that he may have recently sustained some acute emotional or physical shock adequate to produce these phenomena in a perfectly sober person, or that the patient may be actually insane.

Cerebellar Disorder.—This condition is recognized by its characteristic inco-ordination of voluntary movement and by its muscular hypotonia. It is most readily detected in the lower limbs. The reeling cerebellar gait, whether from alcoholic poisoning or from other causes, is noticeable by onlookers and sometimes by the patient himself. Amongst the common manœuvres

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for eliciting the presence of cerebellar ataxia, a favourite one is to ask the patient to walk along a straight and narrow path, then to turn quickly and come back again. The more difficult feat of walking heel-and-toe along a chalk line is an entirely artificial test which quite a number of sober persons may fail to accomplish. Failure to stand on one leg with the eyes shut, of which I have occasionally read as a supposed test of cerebellar disorder, is a mild acrobatic feat which the most sober of us might easily fail to execute during the emotional excitement following police arrest. The most exemplary abstainer may well feel apprehensive if he falls into the hands of a medical officer who exacts so high a standard of cerebellar efficiency.

Cerebellar ataxia of the upper limbs is conveniently tested by asking the patient to place one finger quickly on the examiner's finger-tip, or to raise a glass of water to his lips, or to put a key into its keyhole. In cerebellar disorder these movements are performed jerkily, partly owing to deficient muscular tonus and partly from inability correctly to estimate the range, so that the patient cannot arrest the movement at the desired target but either plunges past it, or may underestimate the range of movement and stop short before reaching the mark, finally swooping down on it with excessive force.

Tabetic Ataxia.—Ataxia of the lower limbs in tabes may be mistaken for drunkenness, but only by a careless medical observer. Unlike cerebellar ataxia, tabetic ataxia is aggravated by closing the eyes. Absence of the ankle-jerks and usually also of the knee-jerks, together with the condition of the pupils, etc., will usually prevent a mistaken diagnosis of this sort.

Ponto-bulbar Symptoms.—In this connection dilatation of the pupils is a sign upon which considerable emphasis has often been laid. In my opinion, its importance is often exaggerated; the pupillary

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dilatation in alcoholic intoxication is usually moderate in degree, and in slighter degrees of intoxication sometimes absent. In profound alcoholic stupor, on the other hand, dilatation of the pupils is the rule with sluggish response to light.

One Christmas eve, when sitting at a table in a Pullman car, during a railway journey of an hour and a-half, I found myself opposite a fellow-passenger who consumed, under my own eyes, five large whiskies-and-sodas in rapid succession, thereby providing me with an opportunity of studying with ease and comfort the onset of toxic nervous phenomena. Towards the end of the journey he became mentally confused, happy, noisy and slightly dysarthric. As he leaned across the table to offer to me, a complete stranger, the compliments of the season, I carefully observed his pupils; they were not dilated and reacted normally to light.

During the process of alcoholic poisoning transient weakness of the external ocular muscles is frequently produced. In its milder degrees this manifests itself by deficient power of convergence, and when combined with mild cerebral symptoms which so frequently coexist, this helps to account for the drunk man's difficulty in visual fixation and for his characteristic fatuous look. A somewhat greater degree of weakness of the ocular muscles produces double vision, a symptom which usually impresses itself even on the sufferer's fuddled consciousness. Disorder of lower bulbar nuclei may produce temporary indistinctness of articulation or dysarthria. In my opinion disordered articulation, to be of value in establishing the diagnosis of alcoholic intoxication, should be present in the pronunciation of words which the individual himself is likely to use in ordinary conversation, for example, "She stood on the door-step, welcoming him in." It is all very well to try an elocutionist, a schoolmaster, or a member of a learned profession with "tongue-twisters" such as "Terminological inexactitude," or "The Leith police dismisseth us." But to expect perfection with such phrases in a chauffeur, a labouring man, or even in an average member of society, especially at a time of

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emotional strain, is unfair. Indistinctness of articulation, to be of diagnostic significance, should be present when the person is using words of his own vocabulary.

We must be careful to exclude dysarthria due to various organic causes, whether in the brain-stem or bulbar nerves, or in the palate, lips, or tongue. Moreover, ocular and bulbar symptoms, not unlike those of alcoholic poisoning, varying in degree and sometimes of transient duration, are also met with in myasthenia gravis, admittedly a rare disease.

Vascular and Visceral Phenomena.—Among the vascular and visceral phenomena indicative of disorder of the vegetative nerve-cells, some of which are situated within the brain-stem, we may mention the flushed face, rapid pulse and warm, sweating skin, also the occurrence of salivation and vomiting, although this latter symptom may be partly gastric in origin.

The pupils, when they happen to be dilated, still preserve their reaction to light, although increasingly sluggish as the intoxication becomes deeper, in contrast with the extremely dilated and totally insensitive pupils of poisoning by belladonna hyoscine and similar drugs.

Disorder of the reflexes, in my opinion, is of no clinical value in the recognition of acute alcoholic poisoning. Exaggeration of the knee-jerks and other deep reflexes is sometimes mentioned by medical officers as a sign indicating acute alcoholic poisoning, but the degree of briskness of these reflexes varies so widely in normal individuals that we cannot regard their exaggeration as of any diagnostic significance. Ankle clonus never occurs from acute alcoholic poisoning; nor do we find extensor plantar responses, which, by the way, may sometimes be present in the coma of opium, sulphonal, veronal or coal-gas poisoning, whilst in uræmic coma and in post-epileptic coma convulsions may be superadded.

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has actually reached the central nervous system. Unfortunately, it is rarely feasible to carry out lumbar or, still better, cisternal puncture.

With the co-operation of my late house physician, Dr. J. G. Wilson, at Westminster Hospital, I had the cerebro-spinal fluid analysed for alcohol in three successive cases of severe alcoholic poisoning, with a positive result in each case. Incidentally, in uræmic coma urea is present in excess in the cerebro-spinal fluid and an excess of sugar in diabetic coma.

SUMMARY OF DIAGNOSTIC PROCEDURE.

The following is a summary of the procedure suitable for adoption when a practitioner is called to see a comatose patient. First, we inquire into the history of the patient's previous health, whether he has recently had a head injury, under what circumstances he was discovered to be unconscious, whether the unconsciousness was sudden or gradual in onset, and whether it was preceded by other symptoms such as convulsions or headache. We next examine the patient, feel his head for signs of injury, smell his breath, examine his pupils, noting their size, equality or inequality, and their reaction to light. We examine his heart and note the character and frequency of the pulse and respirations. We note the radial systolic blood-pressure and measure it by a manometer. We observe whether the face is symmetrical or not, and whether there is conjugate deviation of the head and eyes in any direction. The optic discs and fundi should be examined in all cases of coma or stupor. We lift the limbs in turn and let them fall, observing whether there is any difference between the flaccidity of the two sides. We test the knee- and ankle-jerks and examine the plantar and abdominal reflexes on both sides. Then we pass a catheter, draw off the urine, note its specific gravity, and test it for albumin,

unconsciousness in the deepest stage of alcoholic intoxication, the smell of the breath is of value, with certain limitations to which I have already referred.

Alcoholic stupor is usually associated with a warm, moist skin, and accompanied by the characteristic alcoholic odour, coexisting with fairly wide dilatation of the pupils, which still react to a bright light. The odour of the breath may point to poisons other than alcohol. The smell of opium is characteristic when laudanum has been taken by the mouth, and in opium or morphine poisoning the pupils are closely contracted. The toxic coma of uræmia is often accompanied by a urinous odour in the breath, and that of diabetic coma by the sweet hay-like smell of acetone.

Analysis of the Urine.—This may be helpful in cases of deep unconsciousness.

In alcoholic poisoning, alcohol can be detected in the patient's urine by adding bichromate of potassium solution followed by a few drops of strong sulphuric acid; if alcohol is present, a bright green colour appears, together with a smell of aldehyde. Another simple test is by adding an equal quantity of a strong solution of iodine in iodide of potassium, followed by a few drops of caustic potash, drop by drop, until the iodine is decolorized. Iodoform crystals are produced, accompanied by a characteristic odour.

Other substances should also be looked for in the urine in cases of unconsciousness. Patients with diabetic coma will show not only sugar but also oxybutyric acid, aceto-acetic acid and acetone. The presence of albumin, on the other hand, together with casts and epithelial elements, is suggestive of uræmic coma, although in some cases of interstitial nephritis albumin and casts may be scanty or absent.

Examination of the Cerebro-Spinal Fluid.—Tests can also be carried out on the cerebro-spinal fluid. To my mind, the presence of alcohol in the cerebro-spinal fluid is really the only sign at our disposal which can be regarded as pathognomonic. If positive, it is conclusive evidence of alcoholic poisoning which

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for sugar and for acetone. Finally, we note the temperature in both axillæ, and in all doubtful cases we perform a lumbar or cisternal puncture and examine the cerebro-spinal fluid. In patients from malarial districts we should also examine a blood-film for the malaria parasite.

PITFALLS IN DIAGNOSIS.

The average case of drunkenness presents little or no difficulty in diagnosis. The really difficult cases are at the two extremes of the series—namely, those in which the impairment of cerebral function is very slight, and those in which it is so profound as to cause deep unconsciousness or stupor.

In the slighter cases two distinct and successive facts must be proved to have occurred in order to establish a diagnosis of drunkenness. First, it must be shown that the person has recently taken alcohol. The immediate antecedent history of the case, the surroundings under which the person came under observation by the police, the alcoholic odour of the person's breath, are all suggestive, so far as they go, but not conclusive. Whilst a drunken man's breath will usually smell of alcohol, so may a perfectly sober man's; otherwise it would be dangerous for an archbishop to drink a glass of sherry with his lunch. Conversely, the absence of alcoholic odour in the breath, so far as it goes, is against the presence of alcoholic poisoning.

Secondly, the reactions of the person's central nervous system to his surroundings must be shown to be temporarily disordered to such a degree as to be injurious to himself or to other people.

A person who suffers from pre-existing disease of the central nervous system, thereby presenting corresponding cerebral, cerebellar, ponto-bulbar or other symptoms, and who happens to come under observation

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after taking alcohol in the most moderate amount, may easily be the victim of an injustice. But in such a patient the phenomena will not be temporary as in intoxication; they will be present both before and after the alleged alcoholic poisoning. Apart from pre-existing diseases of the nervous system, anatomical abnormalities, such as deformities of the lower limbs, have also been known to give rise to mistakes.

I remember the case of a taxi-driver with deformed feet, who had the misfortune to be arrested on a cold winter's night outside a bar after consuming a single glass of ginger wine. A police officer, quite reasonably, suspected him of being drunk, but subsequent investigation showed that the man's deformity was the adequate cause of his chronic insecurity of gait.

There is a class of persons—excluding people with pre-existing disabilities of various sorts—in whom transient emotional excitement, such as the fact of being arrested, may simulate alcoholic poisoning of the central nervous system. This is really the most difficult case of all. Where the decision is doubtful, it is the duty of the police surgeon, resisting the human tendency to corroborate without careful consideration the snapshot diagnosis of the police constable, to give the patient the benefit of the doubt. And I am sure that many police surgeons do pursue this course.

If an excited person, examined in the humiliating environment of a police station, is nevertheless able to give a clear and coherent account of his recent doings, his transient excitement and indignation are not necessarily evidence of toxic cortical disorder. If his breath does not smell of alcohol, this is in favour of sobriety; on the other hand, if it does smell of alcohol, this, so far as it goes, is in favour of alcoholic poisoning. But again I would insist that even the combination of an alcoholic odour with emotional excitement is not sufficient evidence of cerebral disorder due to alcohol.

It is different, however, in cases where, superadded to the alcoholic breath and emotional excitement, we

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A person who suffers from pre-existing disease of the central nervous system, thereby presenting corresponding cerebral, cerebellar, ponto-bulbar or other symptoms, and who happens to come under observation

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after taking alcohol in the most moderate amount, may easily be the victim of an injustice. But in such a patient the phenomena will not be temporary as in intoxication; they will be present both before and after the alleged alcoholic poisoning. Apart from pre-existing diseases of the nervous system, anatomical abnormalities, such as deformities of the lower limbs, have also been known to give rise to mistakes.

I remember the case of a taxi-driver with deformed feet, who had the misfortune to be arrested on a cold winter's night outside a bar after consuming a single glass of ginger wine. A police officer, quite reasonably, suspected him of being drunk, but subsequent investigation showed that the man's deformity was the adequate cause of his chronic insecurity of gait.

There is a class of persons—excluding people with pre-existing disabilities of various sorts—in whom transient emotional excitement, such as the fact of being arrested, may simulate alcoholic poisoning of the central nervous system. This is really the most difficult case of all. Where the decision is doubtful, it is the duty of the police surgeon, resisting the human tendency to corroborate without careful consideration the snapshot diagnosis of the police constable, to give the patient the benefit of the doubt. And I am sure that many police surgeons do pursue this course.

If an excited person, examined in the humiliating environment of a police station, is nevertheless able to give a clear and coherent account of his recent doings, his transient excitement and indignation are not necessarily evidence of toxic cortical disorder. If his breath does not smell of alcohol, this is in favour of sobriety; on the other hand, if it does smell of alcohol, this, so far as it goes, is in favour of alcoholic poisoning. But again I would insist that even the combination of an alcoholic odour with emotional excitement is not sufficient evidence of cerebral disorder due to alcohol.

It is different, however, in cases where, superadded to the alcoholic breath and emotional excitement, we

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for sugar and for acetone. Finally, we note the temperature in both axillæ, and in all doubtful cases we perform a lumbar or cisternal puncture and examine the cerebro-spinal fluid. In patients from malarial districts we should also examine a blood-film for the malaria parasite.

PITFALLS IN DIAGNOSIS.

The average case of drunkenness presents little or no difficulty in diagnosis. The really difficult cases are at the two extremes of the series—namely, those in which the impairment of cerebral function is very slight, and those in which it is so profound as to cause deep unconsciousness or stupor.

In the slighter cases two distinct and successive facts must be proved to have occurred in order to establish a diagnosis of drunkenness. First, it must be shown that the person has recently taken alcohol. The immediate antecedent history of the case, the surroundings under which the person came under observation by the police, the alcoholic odour of the person's breath, are all suggestive, so far as they go, but not conclusive. Whilst a drunken man's breath will usually smell of alcohol, so may a perfectly sober man's; otherwise it would be dangerous for an archbishop to drink a glass of sherry with his lunch. Conversely, the absence of alcoholic odour in the breath, so far as it goes, is against the presence of alcoholic poisoning.

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have, as is so commonly found, incoherence of thought and speech, together with signs of temporary cerebellar and ponto-bulbar disorder. Unsteadiness of the limbs, evidenced by a staggering gait and by difficulty in performing co-ordinated movements such as pointing to or picking up a small object; true dysarthria, known to be different from the sufferer's ordinary articulation; and diplopia, if it can be demonstrated, are, all of them, definite evidence of disorder of central nervous mechanisms. Other accessory phenomena, inconclusive by themselves, such as hiccup, a warm, moist skin, flushing of the conjunctivæ and face, etc., are valuable corroborative signs.

To my mind the best physical evidence of all is a positive reaction for alcohol in the cerebro-spinal fluid. It must be admitted, however, that few persons are likely to submit voluntarily, and fewer still are likely to volunteer, to have this valuable diagnostic procedure carried out.

After all, the important point is not: "Can the person perform various feats of elocution or mild acrobatic *tours de force*?" (unless he happens by profession to be an elocutionist or an acrobat), but: "Is he in a fit condition to pursue efficiently his ordinary daily avocation in life?" A distinguished officer of the Royal Marines, General E. A. Wylde, with a long experience of courts martial, informs me that in the Services actual testing of a man for drunkenness is discouraged, and that in deciding the question of alcoholic intoxication the crux of the matter is whether the accused man was fit to carry out efficiently his military or naval duties with safety to himself injurious to others.

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The Prevention and Treatment of Pneumonia.

By SIR JAMES BARR, C.B.E., D.L., M.D., LL.D., F.R.C.P., F.R.S.E.

Knight of Grace, Order of St. John of Jerusalem; Consulting Physician, Royal Infirmary, Liverpool; late President of the British Medical Association, etc.

Part 2.

YOU cannot always prevent pneumonia, because you do not get the chance. Many people think it quite time enough to consult the doctor when seriously ill; but you should try and educate your patients up to the point that prevention is not only better, but it is also cheaper than cure. Your interest should be in keeping them alive and healthy—a live dog is better than a dead lion.

When prevention has not succeeded or not been applied, the way to treat pneumonia successfully is to recognize it early. There should be no difficulty in diagnosing it within the first six or at most twelve hours of its onset. Do not treat the case cavalierly as a matter of no importance. The public are naturally afraid of pneumonia because they know the fearful mortality among their friends. Many medical men are afraid of frightening their patients, call it congestion of the lungs, trust to luck, as they know that the great majority get well no matter what they do. It does not matter much what you call it so long as the name does not lead to carelessness of the patient, his friends or yourself. But, in my opinion, it is much better to frighten your patient than to kill him; no patient gets frightened so long as he knows that his medical attendant knows what he is doing. No

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one thinks that he is going to die at the beginning of an illness. "Hope springs eternal in the human breast"; he believes that he is one of the 75 per cent. who recover under any circumstances.

Remember that it is the patient you have to treat, not his disease; make a thorough examination of all his organs, and see in what condition he is to withstand the disease. Luck is a fickle jade which you should not trust; if the patient gets worse, as he probably will, a consultant will be called in who may look grave, shake his head, prescribe a placebo and call your congestion pneumonia. You will then hear from the neighbours that the friends think it is a deplorable pity that you did not recognize the nature of the case earlier.

A severe chill is the usual forerunner of an attack of pneumonia. By paralysing the pneumogastric nerve it leads to congestion of part of one or both lungs, and the consequent serous effusion produces a good culture medium for the ubiquitous pneumococci. If you see the patient early, try and re-establish the function of the pneumogastric.

Give a hot mustard bath, rub the chest with a coarse towel to excite the pulmonic reflex of dilatation, or you may apply a mustard poultice to the part which is not expanding well. The patient should be put to bed, given a bowl of gruel, or a good glass of punch made with rum or whisky. After this there should be no more food for twenty-four hours, except hot water or milk and hot water. Get the bowels cleared out with a dose of calomel and a saline. It is essential that the patient should have a good night's rest without any unpleasant dreams. To attain this end there is nothing better than 10 or 15 grains of Dover's powder.

A good leucocytosis in the early stage of the disease is a favourable omen, but not necessarily so in the late stage when there may be grey hepatization and

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purulent infiltration. An old method which increases leucocytosis is the formation of a fixation abscess by the injection of two drachms of turpentine subcutaneously. This has gone out of fashion, but the application of cantharidis over the affected area is usually very effective.

In all examinations of the blood you should be careful that you are not merely examining a mixture of blood and lymph. It is therefore well to take the blood from a finger, and before making the puncture to compress all the lymph out with a rubber ring. If the blood has also been driven out, and none flows from the puncture, you can rapidly stretch and remove the rubber ring by means of two tapes previously inserted; you then get a pure specimen of capillary blood.

Dr. Gardner Medwin¹ has had excellent results from the injection of nucleinate of sodium. "He found that all types of lobar pneumonia responded to a single dose of sodium nucleinate, the pneumonic process being terminated in forty-eight hours after its administration." He says that nuclein is apt to give rise to acidosis and therefore he gives freely sodium bicarbonate with glucose in lemonade. I suppose he means acidosis indicated by ketonic bodies in the urine, as there is always gaseous acidosis in pneumonia which is necessary to stimulate the respiratory centre.

The work of Dr. Charles MacAlister on allantoin as a cell proliferant is well known; he now tells me that it augments leucocytosis in pneumonia; this is interesting, as in constitution allantoin seems to be linked with nuclein.

Dr. Nott has had excellent results from rectal injections of a solution of the permanganate of potassium. I believe I saw with him the first case of pneumonia in which he used this treatment; the effects were immediate and admirable. Moreover,

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these injections can be used to supplement any line of treatment.

To get the best effects of a suitable vaccine it should be employed within the first forty-eight hours. There is no use in trying it when every other method has failed and the patient is dying. There is an excellent article on the vaccine treatment of acute pneumonia by Professor W. W. Wynn.² He shows that so long as the patient is not sensitized by any chronic infective process you get no untoward effect. His results are excellent, and when the vaccine was injected early the disease rapidly aborted. He says: "Strike early and strike hard." He uses a stock vaccine containing equal parts of pneumococci, streptococci and bacillus influenzae, 100 millions of each. No unprejudiced reader of his paper could reject his conclusions.

The patient should have a bed in the best room in the house, with an air space of at least 2,000 cubic feet for the patient and a nurse. The air should be changed at least three times every hour, which would allow the patient the use of 72,000 cubic feet of air daily. The bed should be arranged like an Ilkley couch, so that the patient can be constantly propped up in a semi-sitting posture, and he can lean towards the affected side. This gives the pneumonic area rest, and enables the patient to take deep breaths and thus make the best use of his remaining vital capacity. The normal vital capacity is more than twice what is necessary for efficient breathing, so that a whole lung may be laid out of action without great distress.

Moreover, the experiments of Lichtheim on a curarized dog "showed that more than the half, almost three-fourths indeed, of the pulmonary channel had been rendered impervious, and consequently the united sectional area reduced almost to a fourth part of its normal dimensions, and yet the normal quantity of

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blood arrived in the left ventricle through the reduced section." Oertel's patient accomplished enormous feats of endurance with a vital capacity of only 85 cubic inches. Of course, in pneumonia both the high temperature and the toxæmia cause acute degenerative changes in the cardiac muscle, with impairment of its function. Still, with a fairly healthy heart both the toxæmia and temperature should be easily controlled so as to enable the heart to carry on its work even with extensive lung consolidation.

I have often shown the great assistance rendered to the right heart by the respiratory pump, and as this depends on the intrathoracic negative pressure controlled by the vital capacity, it is very important that the latter should be maintained as far as possible. The patient should be encouraged to breathe deeply so as to aerate all healthy parts of the lungs, with a view to oxygenating the blood rather than of removing carbonic acid. Any direct attempt to lower the carbonic acid tension in the alveoli is a mistake, as the CO₂ is the direct stimulant to the respiratory centre.

This leads up to the question of the supply of oxygen in cylinders. I suppose in the present day if you allowed a patient to die without a cylinder of oxygen it would be considered almost criminal. In former days brandy was the sheet anchor, and I knew a consulting physician who was always very particular as to his special brand. I am somewhat of the Yankee's opinion that when he saw a cylinder of oxygen he concluded there was soon going to be a death in that house. Many years ago I prescribed oxygen very freely, but when the hospital secretary pointed out to me that during the previous three months the cost of oxygen in my wards had been £100 I began to investigate the matter, and I could not honestly conclude that the oxygen had saved a single life.

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limited, but there is plenty of it in the atmosphere, and there is only a difference of 4 per cent. between the oxygen in the inspired and expired air; thus there is in the air 16 to 17 per cent. of oxygen of which the patient has made no use. No doubt if you give a very large additional supply of oxygen you clear out the carbonic acid and make the patient more comfortable. But what advantageth it when by lowering the carbonic acid tension you remove the stimulus to the respiratory centre, depress the respiratory pump, and thus remove all assistance from the right side of the heart. It is quite conceivable that in a patient living in an atmosphere of oxygen you might establish a condition of acapnia in which the patient would die comfortably, and no amount of artificial respiration would resuscitate him, but only render his recovery impossible.

I see that the question of expense is again being considered, and some have proposed to recover the unused oxygen. Evidently those economists are not acquainted with the experiments of the late Sir B. W. Richardson. He kept rabbits living in an atmosphere of oxygen, but in order to economize he got rid of the CO₂ and the moisture in the expired air. He found that this pre-breathed oxygen had lost its power of preserving life; the rabbits became drowsy and lay huddled up. He then vitalized the oxygen by passing an electric spark through it, and the rabbits became quite lively. An occasional electric spark in the bedroom might do good.

After all, what are a few cylinders of oxygen in twenty-four hours compared with 72,000 cubic feet of air? In order to stimulate deep breathing you should have a current of air playing on the mouth and nostrils. For this purpose a cylinder of compressed air is just as good as one of oxygen. I have often attached a piece of tubing to a foot bellows and made the nurse play a current of air on the patient's

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face. An electric fan is admirable. The oxygen is conveyed to the tissues by the red corpuscles as oxyhaemoglobin. There is a very small amount in solution in the blood which is supposed to be used first, and then the fixed oxygen becomes dissociated but never completely so.

The atmosphere should be dry and only moderately warm. At 65° Fah. the air in this country is never saturated with moisture, so it is capable of taking up the watery vapour in the expiration. When you approach the freezing point it is usually saturated and incapable of taking up any more moisture. I have seen a patient, almost suffocated in his own secretions, rapidly recover when the temperature of his bedroom was raised from 32° to 80° Fah.

Old people and young children often get an attack of pneumonia or bronchitis from the cold, damp air in their bedrooms. Unfortunately these facts are not always recognized, and the bronchitis kettle has not yet been relegated to the lumber room. A great many deaths from pneumonia and bronchitis in children under two years of age are due to this cause. After five years, when the chest walls become firm and the vital capacity is fully established, children are more difficult to kill.

I have indirectly referred to some of the causes of death such as suffocation chiefly in children, but the ultimate cause of death in all cases is failure in the respirations, or in the action of the heart. Of course, if there be not more than a fourth of the aerating surface of both lungs left, the patient is bound to die of asphyxia, though I have seen a case of sarcoma of both lungs live for some time when there was not one-eighth of healthy lung tissue left.

The heart fails from defective action of the respiratory pump and from degeneration of the cardiac muscle due to toxæmia and high temperature. Children as

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to semi-starvation.

Stout, fat, flabby individuals rapidly succumb, not that their temperature is high, but on account of a defective respiratory pump and fatty infiltration of the heart. In these cases there should be no distension of the abdomen which would interfere with the action of the diaphragm.

A cardiac tonic, especially small and repeated doses of pituitrin, is useful, and the diet should consist of an easily assimilable carbohydrate such as glucose, and nitrogenous food such as raw eggs. The following is a useful tonic to be given every four hours: one thirty-second grain of pilocarpine, five minims of dilute hydrochloric acid, three minims of liquor strychnine, and five grains of chloride of calcium in a suitable vehicle. A free supply of table salt is useful in all febrile affections.

A high temperature is often looked upon as one of Nature's methods of combating an infectious process, which is a very comforting idea to *laissez-faire* individuals; but it does not seem to occur to them that, as Samuel Haughton said: "Nature may be driving nails in your coffin." Moreover, a temperature which would kill the pathogenic organisms would also dispose of the host. There can be no doubt that in pneumonia and in typhoid fever, while a very high temperature reduces the viscosity of the blood, it leads to degeneration and enfeeblement of the cardiac muscles, but does not destroy the toxins.

A fall in the temperature is usually a favourable omen, and if you can accomplish this in the early stages by a vaccine or sodium nucleinate so much the better; but in my opinion a long-continued high temperature from any cause works mischief. Therefore, in January 1900, I introduced the use of a very large abdominal ice bag in the treatment of pneumonia³ with excellent results. It lowers the temperature, lessens the disten-

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a rule have very healthy hearts, which make a very vigorous effort for survival; they chiefly die from respiratory failure due to extensive bronchial secretion and defective respiratory pump. These little patients should be kept in a warm, dry atmosphere. There is often an extra interference with their respiratory pump by lessened movement of the diaphragm due to distension of the stomach and bowels with gas. There is one point in favour of young children and even in those of less tender age suffering from pneumonia: their inspirations may appear short, shallow and catchy, but there is frequently a considerable pause between the end of inspiration and the commencement of expiration, which enormously assists the pulmonic circulation by maintaining the intrathoracic negative pressure.

In adults, the vital capacity is usually less in women than in men. With advancing years, and rigid chest walls, there is a gradual failure in the respiratory pump and a corresponding increase in the death-rate. I often recommend people to maintain their vital capacity by respiratory exercises, hill climbing, lessening the amount of lime salts in the diet, and so keep the costal cartilages pliant.

When patients cannot expand their chest owing to a pleuritic stitch, this can be relieved by a mustard poultice, a dose of Dover's powder, and lying on the affected side. When they partly empty the lungs by groaning or otherwise they get the advantage of the respiratory pump at the next inspiration. They should be induced to hold the chest expanded at the end of inspiration for a short period, and to this end it is an advantage to lay hold with both hands of a bed-rail or a suspended bar above the head. I know a big, heavy man who dislocated his humerus by this manœuvre, but notwithstanding this accident he avers that he owed his life to this assistance to his respiration and

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sion of the abdomen; from its action on the splanchnic nerves raises the general arterial pressure, increases the depth and lessens the frequency of the respirations. The abdomen is not particularly sensitive to cold except in the groins, so the patient does not feel at all uncomfortable.

You are more likely to chill the relatives than the patient, as they may think that the ice bag is more likely to cause pneumonia than cure it. Many medical men hesitate to run counter to the wishes of the relatives—the patient unfortunately has often no say in the matter—and play for safety. Personally, I have no use for men who always run along the lines of least resistance, who give oxygen or alcohol because it may be the popular thing to do, without any inherent knowledge as to their suitability for the particular case. Teetotallers, who have no personal knowledge of alcohol, often prescribe it to show their lack of prejudice.

I order the abdominal ice bag in cases of high temperature because I know that it does good, whereas many antipyretics of the coal-tar series do much harm. However, I prefer to knock down the temperature, before it has got out of ordinary control, with a vaccine or other antidote to the poison. An ice bag is very seldom necessary, because the temperature can usually be controlled by getting rid of pneumonia-jackets, eiderdowns, and any impermeable covering which would prevent the free evaporation of the perspiration and thus lessen the abstraction of the latent heat. The patient should be lightly clothed but the lower extremities should be kept warm. A high temperature and, to a less extent, alcohol lead to degeneration of cardiac muscles, sleeplessness, delirium and nervous exhaustion.

There has been so much writing of late about calcium that we might think that a new discovery had been

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made, whereas to some this is a matter of ancient history. In the eighties I began the use of calcium chloride in pneumonia to maintain the cardiac and vascular tone. Since then I have continued to use many ionizable salts of calcium in various conditions; calcium is essential to life as we know it; even micro-organisms require it in their gelatine culture mediums, but its use can be and frequently is abused. In 1910 I gave a post-graduate lecture in Glasgow on the use and abuse of the lime salts in health and disease.⁴

Fortunately the intestinal canal will only take up a limited amount of calcium, and what is absorbed is in the form of a soluble calcium soap. An ionizable salt of calcium is necessary for muscular contraction, but when you get a small, firm artery with an infrequent, irregular or intermittent pulse, and in cases of angina pectoris, there is too much fixed calcium in the muscle of the left ventricle which requires a decalcifying agent such as phosphoric acid. In pneumonia there is too little ionizable calcium either in the blood or heart. The free calcium goes into the air cells and pleura along with the fibrinous effusion. As a consequence one of the earliest signs in pneumonia is the disappearance of the lime salts from the urine. In some cases, no matter how much you pour into the stomach, the amount absorbed is not sufficient.

In these cases you can administer it hypodermically, but this requires more than aseptic precautions; the salt must be very soluble and much diluted with normal saline (sodium chloride only). In an extremely severe case of typhoid fever in a woman in the fifth month of pregnancy there was a deficiency of calcium in the blood, and I gave many subcutaneous injections of a weak solution of calcium chloride, but in a few days a small slough formed at the site of every injection. In substitution of my bath treatment of typhoid she was suspended on a hammock which I specially devised,

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injection. The effect of this change is to bring about a local breaking down of the defensive mechanism against the bacteria of gas gangrene and tetanus. The term Kataphylaxis, or defence rupture, is proposed to designate this new phenomenon."

This report should be read by every one interested in the subject, as space forbids me giving more extracts than will suit my purpose. In my typhoid case there was a breaking down of tissue at the sites of the calcium injections, but there were no gas gangrene or tetanus bacilli about.

My own opinion is that calcium chloride, and no doubt many other salts of calcium, contract or destroy the capillaries and thus deprive the tissues of oxygen. The anaerobic germs will migrate to this chamber deprived of oxygen, and multiply on the dead tissue, whereas aerobic germs cannot exist under such circumstances. However, under no circumstances is it wise to deprive tissues of oxygen; therefore, when calcium salts are injected they should be in an extremely dilute form.

At one time in the treatment of aneurism the subcutaneous injections of sterile solutions of gelatine became popular on the recommendation of a French doctor, but the occurrence of a few cases of tetanus about a week after the injection stopped the practice.

It is well known that many specimens of gelatine contain the spores of tetanus, which are difficult to sterilize, and all gelatine contains calcium. Tetanus has been known to occur from a superficial wound when covered over by isinglass plaster, which formed an anaerobic chamber and supplied both the calcium and tetanus spores.

In pneumonia I place the calcium salts among our best drugs both in prevention and treatment; they coagulate the secretion in the air vesicles, imprison the pneumococci and thus limit the spread of the

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and her temperature was controlled by a small stream of running water over her abdomen; the temperature of the water was regulated so as to keep the patient's temperature slightly above normal. However, she made a good recovery, went to full time, and often returned to hospital to exhibit her strong, healthy child.

This leads me up to another point which I am specially anxious to investigate, as it seems to tell against my advocacy of the use of calcium. In the proceedings of the Royal Society for 1919 there are recorded many experiments by Drs. W. E. Bullock (now W. E. Gye) and W. Cramer, on the calcium salts as an accessory factor in the production of gas gangrene and tetanus.⁵ They found that if cultures of *B. Welchii*, *Vibrion septique* and *B. oedematus* were freed from their toxins and injected into mice the defensive mechanism of the body overcame them and no harm resulted; but when they injected at the same time, and at the same or a different place, an ionizable salt of calcium, the defensive mechanism was ruptured and a fatal gas gangrene developed; the same happened in the case of *B. tetanus*.

In one experiment they injected ten minims of CaCl_2 solution in the right flank, and two hours later a suspension of *B. Welchii* in saline in the back. The mouse was dead in twenty-four hours from gas gangrene. But there is the peculiar fact to record that at the site of the injection of the bacilli in the back there were very few to be seen except those incorporated in the phagocytes. On the other hand, they seemed to have migrated to the site of the calcium, where they were swarming. The experimenters, Drs. Bullock and Cramer, conclude: "From these experiments and other experimental evidence the conclusion is drawn that calcium salts, when injected subcutaneously, produce a local change in the tissues at the site of

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injection. The effect of this change is to bring about a local breaking down of the defensive mechanism against the bacteria of gas gangrene and tetanus. The term Kataphylaxis, or defence rupture, is proposed to designate this new phenomenon."

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disease. The more scanty and inspissated the expectoration the better is it. When you get a large quantity of prune juice expectoration the disease is spreading, and you will find an enormous number of pneumococci. You should check this by the free administration of calcium.

The late Albert Abrams was the first to point out that the parathyroids are the activators of calcium metabolism. It is also well known that thyroid causes active calcium metabolism, but the former is anabolic and the latter catabolic. Iodine and its salts stimulate the thyroid, and for this reason are objectionable in the early stage of pneumonia. After the crisis they may be useful to liquefy the secretion in the air cells and hasten expectoration. I think the calcium iodide is the best.

Cardiac thrombosis is not an infrequent termination, but usually patients get thrombosis because they are dying, rather than die on account of the thrombosis. It occurs chiefly in the right auricle and ventricle, is due to cardiac weakness, blood stagnation, leucocytic destruction and fibrin ferment, rather than to any excess of lime salts. Its occurrence is best prevented by maintaining the tone and contractile power of the heart. A hypertonic serum consisting of calcium chloride, normal saline, and syrup of glucose would lessen blood destruction, and hence the tendency to clot formation.

I have watched cases where the clots were dissipated and the patients cured by the administration of equal parts of liquor ammonia fort, and spiritus chloroform, 5 to 10 minims every half-hour. I have recorded the case of a medical man, apparently dying, with a large clot in his right auricle and ventricle, where recovery took place under this treatment.

This is not a deficiency disease, and a small amount of nutriment is sufficient without any necessity for

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hunting for vitamins; as I look upon the lymph distributors of George Oliver and the lymphagogues of Heidenhain as vitamins, I consider it important that the diet should contain the ionizable salts of calcium, potassium, and sodium. It is a long time since I found that the difference between polished and unpolished rice consisted in the amount of soluble phosphates of calcium. I might be induced to prescribe unpolished rice in pneumonia were it not that the vitamin is overloaded with fermentable starch.

It is a great mistake to worry the patient with much food during the first three or four days of the illness, and it should only be gradually increased as he seems capable of digesting it. It is not what you put into the patient's stomach but what he assimilates that is of any value. It is necessary to supply some food in the form of easily assimilated carbohydrates to prevent the patient burning up his own tissues. An old prescription of mine consists of an infusion of half a pound of raisins in a quart of hot water with three or four ounces of syrup of glucose, two drachms of sodium chloride, and half a drachm of the glycero-phosphate or lactate of calcium. The patient can drink this *ad libitum*. If the syrup of glucose be too sweet or mawkish a quarter of a pound of sugar of milk or honey can be used in place of it.

There is usually a paretic condition of the intestinal tract owing to defective action of the pneumogastric, and any food decomposition is apt to give rise to acute dilatation of the stomach and bowels; when this occurs pituitary extract is the remedy *par excellence*. There is scarcely any anabolic change going on during the febrile stage, and there is no use in troubling the patient with large quantities of nitrogenous food, which are not required and are only apt to form poisonous ptomaines.

Milk is an excellent item in the diet, but it is not

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Practical Notes.

The Treatment of Pyelitis of Pregnancy.

W. S. Pugh states that in the pyelitis of pregnancy most of the urinary tract is involved, and that there is usually a definite lesion of the kidney parenchyma, as well as a uretero-pyelo-cystitis. Urinary antiseptics are of questionable value in the treatment of this disease, and medication should be limited to the use of large draughts of water at frequent intervals. The treatment recommended is the indwelling ureteral catheter, as large a size catheter as possible being left in—the larger the catheter used, the shorter is the duration of the disease. The form of catheter advised is that impregnated with bismuth and known as the X-ray type; it resists corrosion for a much longer period than the ordinary form. The practitioner must not be discouraged because the patient complains of pain in the early stages of the catheter's dwelling; it is easily overcome. Operative treatment of these conditions is very rarely a necessity, and when competent urologists are available premature delivery or abortion is seldom justifiable.—(*Journal of Urology*, November, 1927, p. 553.)

The Causes of Intussusception.

W. E. Hartshorn, in discussing intussusception, comes to the conclusion that the majority of cases of intussusception have as a background one of three things: First, an unusually mobile cæcum or ileum; this is common in infancy, and is the reason why more cases occur at that time than at any other. Second, a tumour of the ileum near the ileo-cæcal valve; when this is present, and there is also a protrusion of the mucous membrane of the ileum through the valve, producing incompetency, an easy route is offered for the intussusception. Third, some factor producing hyperperistalsis; this may be an obstructing band, a Meckel's diverticulitis, a typhoid or tuberculous ulcer, or any other inflammatory condition.—(*Boston Medical and Surgical Journal*, January 12, 1928, p. 1297.)

The Treatment of Asthma with X-rays.

P. Vallery-Radot, P. Gilbert, P. Blamontier, and F. Claude report the results of their treatment with X-rays of sixty-four patients, of whom thirty-one had asthma only, eight vasomotor rhinitis only, while twenty-five had both asthma and vasomotor rhinitis. The X-rays were directed in some cases to the thorax and in others to the spleen; the sittings lasted ten minutes each and were given twice a week, up to a total of ten or twelve sittings. In nineteen patients (30 per cent.) the attacks of asthma or spasmodic rhinitis disappeared, in sixteen (25 per cent.) there was

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always easily digested and consequently it should be well diluted; it should be boiled to get rid of the *Bacillus coli* and other organisms. Milk contains plenty of calcium which is well fixed to the large casein molecules. This can be set free by citrate of potassium, and then with cream or butter it forms a soluble calcium soap which is easily absorbed.

Gelatine also contains abundant calcium, and any tetanus spore which it may contain are harmless in the intestinal tract. The following will serve an adult in the acute stage for twenty-four hours: About two pints of milk with cream, two or three pints of barley water, whey or plain water, six to eight ounces of syrup of glucose, one drachm of citrate of potassium, one drachm of glycerophosphate of calcium, and four to five drachms of table salt. Later on, he can have peptonized bread and milk, or some infant's food, broths, raw eggs, jellies, cocoa or coffee, and a few biscuits or brown bread and butter. He can have cold water when he likes; you can wait on the desire of the patient for solid food. Be always careful that the bowels are not loaded or distended.

This article has now assumed inordinate length, though I could go on writing for a week on such an important topic if I could get the Editor to print, and people to read, my lucubrations.

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- 2 W. W. Wynn, *ibid.*, p. 480.
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- 4 Barr, *ibid.*, September 24, 1910.
- 5 W. E. Bullock (now W. E. Gye) and W. Cramer, *Proceedings of the Royal Society, B.* Vol. 90, 1919.

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definite improvement, and in twenty-nine cases the treatment was unsuccessful to a greater or less extent.—(*La Presse Médicale*, October 5, 1927, p. 1201.)

Re-Injection of Cerebro-Spinal Fluid in Tetanus.

G. Spanyi records his experience of withdrawal of cerebro-spinal fluid in tetanus and its re-injection subcutaneously. He advises this method of treatment as an adjunct to the administration of anti-tetanic serum, basing his opinion on a series of ten cases of tetanus treated in this way. Five to 10 c.cm. of cerebro-spinal fluid were withdrawn in each case and re-injected into the skin of the thigh or the abdominal wall. Of these cases seven, or 70 per cent., recovered, whilst in twenty-seven other cases treated by serum alone the recoveries numbered twelve, or only 44 per cent.—(*Schweizerische Medizinische Wochenschrift*, October 29, 1927 p. 1047.)

The Treatment of Seborrhœa of the Scalp.

J. Sellei discusses the etiology and treatment of seborrhœa of the scalp, and emphasizes its relation to acne and to seborrhœic conditions of the face. He notes, however, that all three conditions may occur independently, the very severe seborrhœa of the face so commonly seen in Parkinsonianism, and which is never associated with a similar condition of the scalp, being quoted as an example. For the falling out of hair which often accompanies or follows seborrhœa of the scalp, Dr. Sellei recommends cataphoresis with a solution of ammonia or quinine as a useful method of treatment, but states that in cases with very dry hair or scalps this should be combined with prolonged application of sulphur or coal-tar preparations. Favourable results have also been obtained by first applying cholesterin or cholesterin salts to the scalp and later changing to cataphoresis with a solution of quinine.—(*Dermatologische Wochenschrift*, October 8, 1927, p. 1417.)

The Treatment of Whooping-Cough.

W. D. Anderson and C. E. Homan have studied the effect of ephedrine hydrochloride in a series of cases of whooping-cough. They found that this drug, given by the mouth in a watery solution in $\frac{1}{4}$ -grain doses at bedtime ($\frac{1}{8}$ -grain doses in children under one year of age), gave relief from spasmodic cough and vomiting in 18 out of 20 cases of whooping-cough in which it was used. In all cases in which improvement was noted some cough remained, but this was mild and of a type associated with respiratory infection, none of the characteristic remaining. No serious toxic symptoms occurred in these cases. They believe that even smaller doses would be useful during the second stage of the disease. The *Journal of the Medical Sciences*, L

Preparations, Inventions, Etc.

OSTELIN.

(London : Ostelin, 56, Osnaburgh Street, N.W.1.)

It is now fully recognized that the therapeutic value of that old medical stand-by, cod-liver oil, lies in its vitamin D content, of which, indeed, it is the chief natural source. It has more recently been shown that the vitamin content of cod-liver oil resides entirely in the unsaponifiable fraction of the oil, and constitutes less than 1 per cent. of its volume, the remaining 99 per cent. consisting of fat which has no therapeutic value, but is highly indigestible and nauseous to the patient. Ostelin is a preparation of the active medicinal portion of cod-liver oil separated from the fatty constituents of the oil, and presenting vitamin D in very high concentration, some idea of which may be gained from the fact that 400 gallons of cod-liver oil are needed to produce one pint of ostelin. Recent observers have confirmed the action of vitamin D in increasing the blood calcium, balancing metabolism, and ensuring an acid faecal reaction. The last is important in inhibiting the formation or absorption of toxic substances, and it seems likely that the effect of such a substance as ostelin on faecal reaction is one which should lead to its therapeutic employment in many conditions which may be collectively grouped under the heading of debility. Flaminini, after a series of experiments in which ostelin was used, as being a concentrated preparation of vitamin D, came to the conclusion that all conditions due to an acidosis must benefit by its administration, and the number of diseases which may thus be described is very considerable. Ostelin is available in glycerine suspension ("ostelin," which can be prescribed in mixtures with other medicaments), tablets, ostelin with malt extract and orange juice, and ostelin cream, the last being a very palatable vegetable oil emulsion containing ostelin equivalent to 50 per cent. of cod-liver oil of high activity combined with calcium glycerophosphate.

MONSOL.

(London : The Mond Staffordshire Refining Co., Ltd., 47, Victoria Street, S.W.1.)

Monsol is a germicide derived from the oils produced by the gasification of coal by the Mond Power Gas Process; these oils are fundamentally different from those produced by the ordinary process of coal-gas production. In a series of animal experiments to determine the lethal dose, it was found that while 2·5 c.cm. of lysol was fatal to a rabbit, 15 c.cm. of monsol was not, the assumption being, therefore, that monsol is over six times less poisonous than lysol. Other experiments showed that the tolerance of animals to intravenous injection of monsol was remarkable, no ill-effects following the injection of considerable quantities. As a result of bacterio-

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APRIL

1928

Recent Advance in the Treatment of Leprosy and its Bearing on Prophylaxis.

By SIR LEONARD ROGERS, C.I.E., M.D., F.R.C.P., F.R.S.
Physician and Lecturer, London School of Tropical Medicine; Member of Medical Board, India Office; late Professor of Pathology, Medical College, Calcutta; Lt.-Col., I.M.S. (ret.).

IN THE PRACTITIONER of August 1921 I summarized five years' research in India on the treatment of leprosy by injections of soluble preparations of the active portions of the old Indian remedies, chaulmoogra and hydnocarpus oils. Further progress has since been made, and we are now in a far better position to deal with the problem of reducing this justly dreaded disease in our Empire, with a million or so lepers, if early cases are included. So I may now return to the subject.

Gynocardate Treatment.—Chaulmoogra oil orally was too nauseating in full doses to be of much value, and intramuscular injections of the whole oil were very painful, although in 1914 Victor G. Heiser reported improved results by this method in the Philippines. It was at his request that I took up further work on the subject in continuation of my

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HOVIS BREAD.

(London : Messrs. Hovis, Ltd., 154, Grosvenor Road, S.W.1.)

Wholemeal bread and white bread both have distinguished advocates in the medical profession and in the Press. Even the supporters of the first admit the palatability of white bread, and the supporters of the second have to admit the superior vitamin percentage of wholemeal bread, although the yeast of white bread is also a vitamin-producer. On the other hand, however, wholemeal bread contains a considerable percentage of indigestible bran, and white bread has had its wheat germ carefully removed, thus losing the part richest in vitamin B. Apparently it had not occurred to the advocates of wholemeal and of white bread that there might be a method of combining the advantages and eliminating the disadvantages of both. This is done in Hovis bread, which differs from other brown breads in being prepared from fine white flour blended with 25 per cent. wheat germ. Hovis bread thus combines the palatability and other good qualities of white bread with the essential and valuable vitamin B content of the wheat germ, but, unlike wholemeal bread, it does not contain any bran.

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also adopted on a large scale in the Philippines with the addition of 1 per cent. iodine, and by E. Muir in Calcutta with equal parts of olive oil and 4 per cent. creosote to form his E.C.O. mixture. In 1925 E. Muir reported his adoption of pure *hydnocarpus wightiana* oil from South-west India with 4 per cent. creosote as less painful and as efficient as the much more expensive ethyl esters, and R. M. Wilson in Korea has used the Chinese *H. anthelmintica* oil in the same manner with very good results.

Recently the disadvantages of hydnocarpates have been overcome, for T. A. Henry made for me the sodium salts or soaps of selected fractions of *hydnocarpus* oil, consisting mainly of hydnocarpates, which are painless in neutral 3 per cent. solutions subcutaneously and intramuscularly, and can be given in a 2 per cent. solution intravenously by Muir's simple plan of drawing up about an equal quantity of blood from the vein into the dose in a syringe, mixing by rotating the syringe on its long axis with the needle in the vein, and injecting the whole rather slowly to avoid temporary giddiness due to full doses. This preparation is made by Messrs. Burroughs, Wellcome & Co., under the name of "alepol," at one-twentieth the cost of a good ethyl ester, so that full bi-weekly doses for a year only cost half-a-crown. Many hundred cases are under this treatment in Africa and elsewhere with very promising results, and Muir has adopted it as part of his routine treatment.

A 3 per cent. solution of alepol with 0.5 per cent. carbolic acid keeps well, and the first dose is 0.5 c.cm., increased by 0.5 c.cm. at each dose up to 5 or more c.cm. as long as no febrile or local reaction occurs, and injected twice a week. After any reaction, in the form of slight fever, swelling and softening of the skin lesions or pain in the nerves, a week's rest should be given and the same dose repeated, and only increased again when no reaction follows. Repeated

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earlier observation that the so-called gynocardic acid—the name given by Moss in 1879 to the lower melting point fatty acids of chaulmoogra oil—was more effective orally than the whole oil. In 1915 I commenced the subcutaneous and intramuscular injection of the soluble sodium gynocardate, and in 1916 and 1917 I reported its intravenous use to be safe and more efficient, and that it was followed by slight fever accompanied by reactionary swelling and softening of the nodules, with breaking up of the lepra bacilli in the tissues, followed by absorption and eventual disappearance of both the lesions and the causative organism.

Sodium Morrhuate Treatment.—In 1918 I showed that good results could also be obtained by injections of sodium morrhuate, made on similar lines from cod-liver oil, and in my 1921 paper on fifty-one cases treated for three months and upwards I recorded that 41 per cent. were completely cleared up, 39 per cent. were greatly improved, 18 per cent. improved and 2 per cent. were stationary.

Hydnocarpate Treatment.—In 1920, E. L. Walker and Marion Sweeney showed that my sodium hydnocarpate preparations prevented the growth of acid-fast organisms when added to culture media in dilutions of 1-100,000 to 1-1,000,000, but chaulmoogrates, which I had found useless in leprosy, had no such action, nor had sodium morrhuate, although active in leprosy.

For use on a large scale the hydnocarpates had the great drawback of being rather painful and slow subcutaneously, and they caused irritation and blocking of the veins by the more effective intravenous method. A further advance was made when A. L. Dean and H. T. Hollmann, in Hawaii, reported in 1919 good results from intramuscular injections of the ethyl esters of chaulmoogra oil fatty acids; they were

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also adopted on a large scale in the Philippines with the addition of 1 per cent. iodine, and by E. Muir in Calcutta with equal parts of olive oil and 4 per cent. creosote to form his E.C.O. mixture. In 1925 E. Muir reported his adoption of pure *hydnocarpus wightiana* oil from South-west India with 4 per cent. creosote as less painful and as efficient as the much more expensive ethyl esters, and R. M. Wilson in Korea has used the Chinese *H. anthelmintica* oil in the same manner with very good results.

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slight reactions should be aimed at, which will result in gradual disappearance of the lesions and the lepra bacilli, the breaking-up of the latter setting free antigens with gradual production of immunity. As the drug is quickly absorbed and is active by intramuscular injections, its intravenous use is limited to cases ceasing to react and improve further by the former method of use. The ethyl esters and creosoted *H. wightiana* oil can be used in similar doses, and in cases ceasing to improve on any of these, sodium morrhuate is sometimes effective as a change, for O. Schobl has shown that acid-fast bacilli may become able to stand larger doses of hydnocarpates after a time. In very early cases six months may sometimes suffice to clear up a case, but in advanced ones two or more years may be required. In either case injections should be continued for at least six months after disappearance of all symptoms and of the bacilli, and the patients watched for several years for relapses.

E. Muir has pointed out that in both early cases and those in the third stage, when the spontaneous febrile and local exacerbations of the second stage have ceased, the treatment can be pushed with safety and advantage, but in the active second stage great caution is required in the dosage to avoid harmful excessive reactions with fresh crops of skin lesions.

Iodide-Antimony Treatment.—Iodides have for long been used as a diagnostic agent in leprosy on account of the severe reactions they produce, but were regarded as dangerous in treatment. E. Muir has recently reported that febrile reactions after iodides continuing for over three days can be checked by 0·02 grammes of tartar emetic in 2 c.cm. water intravenously every other day, and he now advocates the use of potassium iodide, beginning with one grain and increasing by one grain daily until a febrile and local reaction occurs, and after it subsides repeating the same dose twice a

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week, and increasing once more when no reaction follows. When 20 grain doses are reached, increase by 5 grains at a time up to 60 grains, and then by 30 grains at a time up to 180 and eventually 240 grains when reactions cease, and continue the full dose for three periods of a month each with a month rest between each, at the end of which the patient is likely to be cured. I have used this plan with great advantage in cases nearly cleared up under hydnocarpates, including alepol, and Muir also finds it of great value in early cases. In the active second stage it should be used only by experienced workers on patients under close observation for fear of doing harm.

Results obtained by the Modern Treatment with Derivatives of Chaulmoogra and Hydnocarpus Oils.—Owing to the great variations in the clinical types, stages and phases of leprosy, many reports based on the treatment of a few cases are worthless or even misleading. Last year, in a discussion at the Royal Society of Medicine, I tabulated the results of those who had treated during recent years a sufficient number of cases to be of value, which may be summarized briefly under the two classes of advanced and early cases, as they yield very different results. Those who work in leper institutions under the compulsory segregation system have to deal almost entirely with very unfavourable advanced cases, as in South Africa and the Philippines, with admissions averaging over four years and eight years duration respectively. The most extensive trials under such poor conditions have been made through the patient labours of American physicians at the greatest leper settlement in the world, at Culion in the Philippines, and last year H. W. Wade and C. B. Lara reported on 6,000 cases treated in 1921 to November 1926, with 629 recoveries, which with discharges to the end of 1926 would reach over 800. As the result of this unique experience they concluded

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thousand cases. Last year Muir, after saying that we have no certain specific for leprosy such as quinine in malaria, continued : "It may also be clearly stated, however, that there is a line of treatment which will cause the permanent disappearance of all active signs of the disease in early cases so that the patient is for all practical purposes *cured* [author's italics], though if a marked reduction in his general health occurs later, there is always the possibility of a relapse." H. F. Sheldon, in South Africa in 1925, went even farther, and stated that : "It is not too much to say that all early cases of leprosy can be cured." Most workers in the compulsory segregation institutions in South Africa, however, do not admit that leprosy can be cured; but this is not surprising when their last report records the discouraging fact that nearly all new admissions are advanced cases of four, six or more years' duration, and most of them unpromising for successful treatment, for this is inevitable wherever reliance is placed almost exclusively on compulsory isolation, with the inevitable hiding of all early cases for fear of lifelong imprisonment with terribly deformed advanced lepers.

Good results from the modern treatment have also been recorded by R. M. Wilson in Korea, with only six relapses among 75 recovered cases re-examined after 18 months, K. Shiga, also in Korea, Isabel Kerr in the Indian Deccan and Genevray in New Caledonia.

The Bearing of Improved Treatment on Prophylaxis.—The primitive plan of imprisoning for life the unfortunate lepers who are no longer able to hide their misfortune is a terrible confession of the failure hitherto of curative medicine. Compulsory segregation in such a chronic infection has only been possible on account of the abject public dread of this deforming disease, although it is not as infectious as the more deadly tuberculosis. Now that the early stages can be cured, and thus prevented from going on to the

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that the modern treatment is decidedly superior to the older ones, especially in early cases, and they continued:

"Though they are admittedly much less effective in well-established, advanced cases, the results obtained in the Philippine Islands during the last few years show that a not inconsiderable proportion of such cases (probably 15 to 20 per cent.) can be apparently cured if treated intensively, under proper conditions." By apparently cured is meant complete disappearance of all active signs of the disease with negative bacteriological examinations. Further, among somewhat less advanced cases treated at a special hospital and in a detention camp, 356 more cases of this formerly incurable disease had become apparently cured, or over 1,000 cases in the Philippines alone in a very few years.

With compulsory segregation in Hawaii, again very early cases are rarely seen, and newly discovered lepers are sent to the Kalihi special hospital near Honolulu, where the less hopeless ones are treated, and the remainder sent on to the Molokai settlement. In the hospital, Dean's ethyl esters have been used in 486 admissions during 1921 to 1925 inclusive, and at the end of 1926, 143, or 29·42 per cent. had been paroled as apparently cured, and only 28 had shown any signs of relapse, most frequently in nodular cases. In 204 advanced cases only 16, or 7·84 per cent. recovered; of 212 moderately advanced ones, 82, or 38·68 per cent. recovered; but of 70 early cases no less than 45, or 64·29 per cent. were paroled. The recoveries were thus about five times as frequent in moderate, and eight times as high in early, as in advanced cases; clearly indicating the necessity of attracting early cases for treatment if the scourge is to be reduced rapidly.

For the results in early cases on a large scale we have to turn to the out-patient clinics first started by the present writer in Calcutta, and continued by E. Muir during the last seven years with an experience of several

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tic contentions of the South African workers, with the notable exception of H. F. Sheldon. As the recent house-to-house surveys in the worst area of Bengal under E. Muir have shown that there are three or four early cases for every advanced census-returned one, it appears that admission of only one-seventh of the total number in the early stage in Honolulu represents only about one-twentieth of the real number of early cases, too few to reduce the incidence at all quickly. We must, therefore, seek some more effective plan of attracting the early cases, and there are two such which I have been advocating for some time.

Relaxation of Compulsory Isolation in the Case of Early Uninfective Lepers.—In countries where much money has been expended in segregating lepers compulsorily I do not advise that this plan be abandoned for the present, but that it should be modified in the following manner to prevent its doing great harm by preventing the patients coming forward for treatment in the earliest stages. For this purpose one at least of our colonies on my advice altered their laws to allow a medical board of experts, appointed to report on all newly-discovered lepers, to permit early uninfective cases to be treated as out-patients at clinics and dispensaries or hospitals. It is only when that is done that the number of such cases in any place is realized, as proved by the fact that several such dispensaries in the bad Bengal leprous area already mentioned have each attracted in a few months 200 to 500 cases for regular treatment. Thus, the root of the problem is being struck at through clearing up by specially trained doctors these large numbers of early cases before they have become infective, for Muir has shown that nearly all early nerve cases and a large proportion of macular skin ones are negative bacteriologically, including the nasal discharge, so need no isolation. Moreover, in India the sodium hydnoarpate for treating sixty cases

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advanced conditions found in leper asylums, the question arises: May not reliance on compulsory segregation as the main prophylactic measure do more harm than good by leading to hiding of the early cases until they have passed the curable stage? I think the following considerations show that the answer must be in the affirmative.

Tracing and Treating Early Leprosy as the most Effective and Economical Method of Prophylaxis.—A moment's consideration will show that if the great majority of lepers can be discovered and treated effectively in the early uninf ective stage, the disease might be very greatly reduced in one or two decades; for the supply of new advanced infective cases would be cut short at its source, while it is known that the duration of life of the most infective nodular type averages only about ten years, and within the same period most of the mixed and nerve cases will have lost their infectivity, so that the main sources of infection will have disappeared. The only question remaining to be answered is whether any approach to this radical solution of the problem is practicable, and here important evidence is already available, but only where compulsory segregation is not relied on almost exclusively for the purpose of reducing leprosy, for under such conditions even the improved treatment fails to attract a sufficiently large proportion of the early cases, as in South Africa and in Hawaii. In the former the medical officers of the compulsory segregation institutions see so few early cases that they have not yet been able to convince themselves that such can, indeed, be cured. At Honolulu it was hoped that the parole of a number of moderately advanced cases would have attracted many in the early stage; but the last report shows that this is not yet the case, for only seventy of 486 admissions in five years could be classed as early, 64 per cent. of whom have cleared up, quite contrary to the pessimis-

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for a year can be supplied at the cost of isolating one; and in New South Wales, for one isolated case, 1,600 could be treated in clinics as far as the cost of the drug is concerned. Further comment is surely unnecessary to prove the immense advantages of the new plan of early treatment in clinics, which the writer started in 1915 in Calcutta, and the present development of which is mainly due to the patient work and advocacy of E. Muir. Fortunately, in India, there are no compulsory powers, except in the case of a few town indigent beggars, and many clinics are being opened by the sixty or so medical men trained yearly in the Calcutta School of Tropical Medicine, including those coming from distant parts of the world. In the Philippines the earlier cases are now being treated at a special hospital and at a detention camp with good results, and only the advanced ones are sent on to Culion; in time, I am sure, this economical and effective plan will entirely replace compulsory isolation, and perhaps the greatest remaining reproach to scientific medicine will disappear. Compulsory powers may be of some use in ensuring regular attendance of the early cases at clinics for fear of imprisonment, with the evidence of the advanced deformed lepers as the penalty for default.

The success of clinics in attracting cases is not limited to India, for some sixty leper clinics are now in operation in British Tropical Africa alone; Dr. Macdonald's cases in Nigeria on a purely voluntary basis have increased from 350 to 840 in ten months, and several thousand will soon be under similar treatment on the Dark Continent, one doctor recently asking for help, which has been sent to him, on the plea that it would take four years to admit his waiting list of lepers without more accommodation. Yet any attempt at compulsion would lead to the disappearance of every hopeful case in these areas.

Systematic Search for Contacts as a Rapid Method of

TREATMENT OF LEPROSY

Reducing Leprosy in Advanced Countries.—The other suggestion I have made for quickly reducing leprosy, described on page 134 of the book by Muir and myself on leprosy (1925), is based on the following two conclusions I came to after three years' close study of some sixty years' literature. First, 80 per cent. of infections are obtained by living in the same house as another leper; secondly, in 80 per cent. the incubation period is under five years, and it averages two to three years. It follows that whenever a leper is met with, all his household and other close contacts should be minutely examined by an expert for early signs of leprosy, and this should be repeated every six months for five years. The treatment of the early cases thus discovered theoretically would reduce the remaining foci of infection to 20 per cent., and in another five years to 4 per cent., within one decade, so that even if in practice the results fall somewhat short of this a great reduction would still remain. Three European countries with a few remaining lepers are adopting this plan, and others are likely to follow, so I see no reason why the disease should not become exceedingly rare in Europe in another two decades, and a striking example set to less advanced countries.

In tropical countries the process will be much slower, but in Africa at least it will be helped by the fact that the indigenous population know the early signs of leprosy much better than many medical men, and they will soon realize the necessity of bringing their lepers early to get the best results from treatment.

Surely the advances of the last decade in the treatment of this justly dreaded disease have rarely, if ever, been equalled in the history of medicine with regard to a chronic intractable disease. There is hope at last for the leper, through more humane methods than hitherto, owing to the success of the modern treatment of early cases.

Angina Pectoris and its Treatment.

By R. O. MOON, M.D., F.R.C.P.

Physician, National Hospital for Diseases of the Heart; Consulting Physician, Royal Waterloo Hospital, etc.

THE classical description of angina pectoris given by Heberden in 1768 still holds good.

"Those who are afflicted with it are seized, while they are walking (more especially if it be uphill and soon after eating), with a painful and most disagreeable sensation in the breast, which seems as if it would extinguish life if it were to increase or continue, but the moment they stand still all their uneasiness vanishes. In all respects the patients are at the beginning of the disorder perfectly well, and in particular have no shortness of breath, from which it is totally different." Unlike most diseases of the circulatory system, angina pectoris requires, more especially for its recognition, the history of the patient, as it is not often that the doctor has the opportunity of seeing the patient actually in an attack.

Though angina is frequently associated with aortic disease and also with aneurysm, yet in neither case could one predict with any certainty that such a patient would have an attack of angina. In most cases there are no objective findings which are in any way characteristic of angina, so we must rely mainly on what the patient can tell us of his attack and more particularly about his pain; for it is the pain which is the cardinal symptom of the case and which brings him to consult a doctor, so we must inquire closely into its nature, origin, seat and distribution. With reasonable care and a moderately intelligent patient one ought

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usually to be able to arrive at a correct conclusion.

The main features of the pain are its situation in the mid-sternal region, its severity, the feeling being as though the heart were squeezed in a vice, its irradiation down the left arm along the ulnar side of the forearm sometimes reaching the little finger, and also occasionally spreading down the right arm. In these cases it is the brachial plexus which is affected, but the radiation of pain may pass into the region of the cervical plexus, reaching the neck, chin, lower jaw and lobule of the ear. Then, too, there may be the sense of impending dissolution, the *angor animi*, which to some patients seems worse than the physical pain. The conditions of the heart and pulse usually remain unaltered, but there is frequently, though not always, a rise in the blood pressure. Contrary to nearly all other affections of the heart the respiratory system is unaffected, there is no dyspnoea, though the breath may sometimes be held from fear lest breathing should intensify the pain.

DIAGNOSIS.

In the classical case of angina, such as is described above, the diagnosis may be easy enough, but there may be other manifestations of the disease, called by the French *formes frustes* and by the late Professor Clifford Allbutt "angina minor." These minor manifestations of angina probably have the same pathology and the same unfavourable prognosis as the severe attacks and may be regarded as analogous to the relation in epilepsy which *petit mal* bears to *grand mal*; just as the essence of epilepsy lies in the sudden, transient loss of consciousness without any motor phenomena, so the essence of angina lies in the peculiar substernal pain without any irradiation of it or *angor animi*. The important thing to realize is that if these minor attacks are recognized and suitably treated, the more severe attacks may be averted.

Angina minor may then exhibit itself in the following

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antecedent of angina is an aortitis just above the sigmoid valves. The late Sir James Mackenzie regarded angina as "An expression of cardiac exhaustion and also an expression of a susceptible nervous system." The sudden death in these cases is due to vagus inhibition.

ETIOLOGY.

(1) Heredity : it is always important to inquire carefully into the family history in a case of angina pectoris, for it is a disease which certainly seems to run in families. (2) The strain of high blood pressure in the aortic system. (3) Infections : syphilis, rheumatism and gout. (4) Intoxications, such as alcohol and tobacco.

It is most frequently seen between the ages of 50 and 60; when occurring under the age of 45 it is most probably due to syphilis. It is much more common in men than women, but comparatively rare among peasants, agricultural labourers and working men; it rather attacks those who have gone in for good living and take little exercise; it is also common among those who are exposed to cerebral overwork. In my opinion, worry and anxiety are important factors in giving rise to the motor spasm which seems to be the immediate antecedent of a great majority of attacks.

The proximate cause, especially of the first attack, is some unwonted amount of exercise in a man past the meridian of life. Often the history is given of walking uphill against a wind when the attack first seizes the patient. Severe and agonizing as the pain of the first anginal attack may be, it usually passes off as the patient stands still, which he instinctively does, after the angina has once begun; then quite a slight exertion may induce an attack, such as undressing for examination by the physician. Not infrequently attacks may occur at night, possibly due to some flatulent dyspepsia, or as a result of a rise of blood pressure caused by the recumbent position. Sometimes the attacks come on

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ways: (1) A single sensation of substernal constriction without any irradiation of pain. (2) Pain in one arm accompanied by severe substernal oppression. (3) Painful sensations situated in the arm or leg without any pain in the chest. Recently I had under my care in hospital a man who had suffered from pain in the left arm for nearly two years and had been treated for rheumatic neuritis; it was only at the end of that period that he began to have severe substernal oppression associated with the pain in the left arm. (4) The severe pain may be localized exclusively at the level of the epigastrium, accompanied by gastric troubles, vomiting and nausea.

PATHOLOGY.

Generally after death there is found some narrowing of the coronary arteries, which may be affected at their orifices or in any part of their course; there may be an atheromatous or calcareous thickening of the arterial walls. This condition of the coronary arteries is a result of subacute or chronic aortitis, which may be induced by syphilis, gout, lead poisoning or alcohol; of these, syphilis is probably the most common cause. This damage to the coronary arteries results in impairment of the blood irrigation of the myocardium which, like the grey matter of the central nervous system, shows a high degree of sensitiveness to an impaired supply of oxygen. This impairment of the vascular condition of the myocardium may be brought about by vascular crises in the coronary arterial distribution due to vaso-motor influences which are not associated with anatomical lesions of the arteries. But the condition of the coronary arteries cannot be the sole factor in the production of angina, for cases with sclerosed coronary arteries are by no means uncommon which present no symptom of angina, and there are cases of angina which show healthy coronary arteries. Consequently, it has been thought by some that the true pathological

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at night at the termination of a dream or, rather, of a nightmare. Other slight causes which seem to provoke attacks are quick eating, an attack of coughing, yawning, sneezing, some rapid movement, some keen emotion, such as anger, joy or fear; and people who suffer from angina should be warned of the danger of flying into a passion. The attacks are sometimes announced by prodromata such as meteorism, or painful sensations in the limbs, which might be compared to the aura of epilepsy.

PROGNOSIS.

This is extremely difficult and at the same time of the greatest importance; a single attack, though there may be no objective findings in the heart, should be viewed seriously. The first attack may indeed prove fatal, as in the classical case of Dr. Arnold, but this is very rare. It is not possible to tell that any given attack may not have a fatal issue; in fact, sudden death is a common termination of angina. Still, with reasonable care, the condition should not be regarded as incurable. Some cases do seem to recover—at least they are free from attacks for long periods—and I have met with several patients who, after a few typical attacks, have had no more for ten years. This is most likely to happen in the middle period of life when the underlying cause is syphilis, rheumatism or influenza; while in later life, when myocardial changes are so commonly associated with angina, the outlook is clearly worse. Speaking generally, the more frequent and the more severe the attacks, the worse is the prognosis; when the seizures occur without any obvious provocation, and particularly at night when the patient is at rest, the outlook is always grave; for the more easily the paroxysms are evoked, the more extensive is likely to be coronary obstruction, and consequently the more serious the complaint. During the attack a slow pulse is of evil omen, and so also is the pulsus alternans. It should

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be remembered that behind the symptom-complex of angina there is practically always some organic disease of the heart, and death comes more readily when aortic disease or aneurysm is present. It is never wise to give a favourable prognosis even though you have failed to detect any organic disease of the heart; generally there will be found some morbid changes in the heart or aorta, or both. There is a tendency for the attacks to be less frequent and less severe if dilatation of the heart supervenes. Serious signs are very high blood-pressure readings, advanced arteriosclerosis, and indications of myocardial weakness as evidenced by the inverted T wave in leads I or II of an electrocardiographic tracing.

TREATMENT.

In an attack the efficacy of amyl nitrite is well known to all, best given in the form of glass capsules (m iii to v) which may readily be broken and the vapour inhaled. The rationale of the treatment is not so entirely obvious, because it does not always reduce the blood pressure and is often quite effective when the blood pressure is relatively low; it may be that it has some little understood sedative effect. Sometimes it is well to follow this up with a drachm of spt. ammon. aromat. or spt. aetheris co. If no relief comes from the nitrite inhalations we must fall back on hypodermic injections of morphia, which has a stimulating and vasodilator action as well as a merely sedative one. It is advisable to begin with not less than gr. $\frac{1}{4}$. The patient nearly always prefers the standing or sitting posture, and he should not be encouraged to lie down. It is often well to supplement the medicinal agents by the application of hot bottles to the extremities or by heat to the praecardial region, the epigastrium, or between the shoulders.

In the intervals of the attacks the daily life of the patient must be carefully regulated. It is well to

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search for the possibly immediately exciting cause of the attack, when it is not obviously produced by exertion or excitement. Attacks are frequently started by an overloaded stomach, so that some writers speak of a "gastric angina," and without doubt much can be done by a judicious regulation of the diet, the main thing being moderation in quantity, the avoidance of a heavy meal and the substitution of a largely vegetable dietary in place of meat; but it is not well to be unduly meticulous in one's advice, as it may easily make the patient introspective and enhance the apprehensions, which he not unnaturally has, after he has experienced several attacks. With regard to alcohol, for those who have been in the habit of taking it, there is little objection to their having it in the form of light wines as a means of promoting digestion in certain cases and perhaps also as exercising a somewhat sedative effect. On the other hand, tobacco should be ruled out at all cost, and there is probably no one thing which has such a prejudicial effect upon patients suffering from angina as tobacco. Indeed, French physicians speak of a definite "tobacco angina"; but in my opinion this is not a true angina, but belongs to the category of angina vasomotoria.

Rest.—After a first attack, or when several have occurred in quick succession, it is well for the patient to be in bed for a few weeks; but in an ordinary way exercise is quite permissible, provided it is taken in moderation, avoiding all hurry, and when mounting stairs doing so slowly and with caution. In particular, the patient should be warned against walking after a meal, or against a cold wind or any sudden jerking effort, even if a slight one. He should be careful about all movements of the arms, and particularly the left arm as when carrying a small handbag. Patients suffering from angina require nearly as much care with regard to their mental as to their physical condition,

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for much mental exertion or emotional excitement may be as harmful to these patients, many of whom are decidedly neurotic, as undue physical exercise. To be able to suggest the right amount and kind of mental exercise to be indulged in is an important side of the province of the physician. For the most part, mental activities will have to be restricted to routine duties, and it may be well to endeavour to calm the irritability of the nervous system by the administration of ammonium bromide (grs. xv to xx) three times a day.

Clothing and Climate.—It is important that flannel should be worn next the skin and that the extremities should be kept warm; washing the face in cold water or getting into a bed with cold feet may readily bring on an attack. When it is possible to choose a climate, it is well for the patient to go to some place which is soft and mild and free from much wind.

Drugs.—In many cases it will not be necessary in the intervals to give any medicine at all. Should there, however, be a syphilitic basis for the angina, then anti-syphilitic remedies will be applied; but, even apart from any question of syphilis, of all drugs the iodides are, no doubt, most generally helpful, and the iodide of sodium is to be preferred. Naturally, when the blood pressure is exceptionally high and careful dieting has had no effect upon it, one has recourse to the nitrites, though they seem to me much less effective in averting the recurrence of the attacks than in relieving the actual attack. For permanent use I have found erythrol tetranitrate gr. $\frac{1}{2}$ t.d.s. the most satisfactory of these preparations; but sodium nitrite gr. i with potassium nitrate grs. x is a useful combination. On the whole, in cases where the attacks are somewhat frequent, I have found theobromine grs. v t.d.s. more effective in reducing the severity and frequency of the attacks than any other drug.

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valve. The usual type is the "buttonhole" variety.

It is difficult in the febrile stage to decide whether the mitral valve is affected or not. The heart may be slightly enlarged, and a soft systolic murmur heard at the apex. It must be realized that in all acute febrile conditions the myocardium is temporarily affected, causing lack of tone of the heart muscle, so that the systolic murmur may merely be due to a relative incompetence of the mitral valve from slackness of the mitral ring, or due to organic changes in the mitral valve itself. Permanent mitral incompetence is indicated by the persistence of the murmur, which becomes louder and less localized, and tends to replace the first apical sound. Also the left ventricle is large, the second pulmonary sound accentuated, and the murmur is conducted outwards and increased by exercise.

Involvement of the myocardium is shown by tachycardia, praecordial pain or discomfort, and by diminished response to effort, and clinically by cardiac enlargement, alterations in the character of the heart sounds, and by the presence of atonicity murmurs. The first apical sound may be muffled and blurred, and not infrequently in severe cases a typical "canter" rhythm is heard. The heart-beat is occasionally tumultuous. Less commonly other myocardial changes may be found, such as heart block, auricular fibrillation and all types of abnormal rhythm.

Organic involvement of the mitral valve will in time lead to stenosis, though this is not usually apparent clinically during the first rheumatic attack, since the process takes several months to develop. In my opinion the earliest sign of mitral stenosis is an alteration in the character of the first apical sound, which becomes shorter and louder in slapping. Later, exercise may bring out a short presystolic crescendo bruit, which is at first very localized and usually heard just internal to the apex beat. Gradually the

Observations on the Rheumatic Heart.

BY JENNER HOSKIN, M.D., M.R.C.P.

Assistant Physician and Cardiologist, Royal Free Hospital, etc.

A CUTE rheumatism tends to run a different course in adults and in children. In the former arthritic manifestations are a prominent feature and the heart often escapes. In children joint affections are usually slight, and may be absent, whereas the heart is frequently attacked. In children the only evidence of an active rheumatic infection may be "growing pains," tonsillitis or chorea, and therefore it is of the utmost importance to recognize and pay due regard to their occurrence. Chorea is, as a rule, a rheumatic manifestation, and frequently leads to severe cardiac involvement, and not uncommonly the pericardium is seriously affected. In children the rheumatic virus tends to attack all the coats of the heart—the pericardium, myocardium and endocardium, whereas in adults the pericardium frequently escapes. For this reason rheumatic heart affection in children has a much more serious import than in adults. When the endocardium is affected, the usual site is the mitral valve. The process commences as an inflammatory leucocytic infiltration of the mitral cusps, causing swelling and loss of elasticity. Gradually as the active stage passes the stage of repair sets in, resulting in fibrosis, contraction, and thickening of the cusps with consequent failure of apposition. Thus the valve becomes incompetent. In time, as the fibrosis increases, the valve becomes more deformed, and adhesions take place between the apposing edges of the cusps causing a narrowing or stenosis of the

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absent, and the prognosis correspondingly good.

Aortic regurgitation is always due to organic changes in the aortic valve. Though aortic reflux from aortitis is the usual form of heart affection in syphilis, in 60 to 70 per cent. the condition is the result of acute rheumatism. It may occur in the acute stage of rheumatic fever, when all the valves are involved in a severe attack, as in pancarditis, but as a rule it occurs insidiously after the acute stage is past, and is more likely to be found after the second or third attack. It is rather uncommon to find aortic reflux of rheumatic origin without an accompanying mitral lesion, and as a rule it appears later. The diastolic bruit is earliest heard over a small area in the third left space close to the sternal edge, and is often only audible when the person holds his breath in expiration when leaning forward. As the reflux increases the murmur becomes louder, and is conducted downwards towards the apex, and may be audible down both sides of the sternum. It is almost always accompanied by a systolic murmur, which in most cases is exocardial. The extent of the regurgitation is gauged by the degree of collapse of the pulse, provided there is no co-existing aortic stenosis. In my experience the diastolic murmur of rheumatic aortic reflux is always best heard over the second or third left spaces, in contrast to that of specific aortitis, where it is loudest over the second right space. This is contrary to the teaching of most textbooks, which I can only imagine repeat the inaccuracies of preceding ones.

Aortic stenosis is not infrequently found with rheumatic aortic reflux, though extremely rarely as a single lesion. To diagnose aortic stenosis there should be a loud, rough, systolic murmur, best heard over the second right space and conducted up into the neck vessels. A systolic thrill can usually be elicited. The typical anacrotic pulse is usually modified by the

presystolic murmur is present at rest, and may be accompanied by a thrill. At the same time the pulmonary second sound, if not already accentuated from a pre-existing mitral reflux, becomes so now. As the condition develops there is heard a short, soft, diminuendo bruit early in diastole, and there may be a reduplication of the second sound over the pulmonary area and at the apex. The slapping nature of the first apical sound persists, and is the one clinical feature found in all stages of mitral stenosis. In the developed state the pulse is small and tends to be on the fast side, and the facies is typical. Where the mitral valve is affected before ten years the growth tends to be stunted. As the extra work on the auricles and right ventricle begins to be felt, the occurrence of premature contractions either arising in the auricles or right ventricle is an indication of myocardial fatigue, and unless adequate measures are taken to relieve the auricles they will shortly go into fibrillation. Finally, owing to auricular fatigue and failure, the auricles go into fibrillation. The presystolic element tends to disappear, whereas the diastolic becomes more marked and replaces the second sound. The rhythm becomes completely irregular, and unless controlled by digitalis the ventricular rate tends to be rapid and signs and symptoms of heart failure make their appearance. Another type of mitral stenosis is frequently met with in middle-aged people, mostly women. In this type the left ventricle is small, and there is no accompanying mitral reflux. There is often no rheumatic history, or at the most only an indefinite one. The pulse is small, but not uncommonly the blood-pressure is raised. Inquiries have not elicited a history of scarlet fever or of influenza, and I believe it to be rheumatic, and due to a subacute or chronic infection, in contrast to the acute illness leading to the typical rheumatic heart. In these cases the symptoms are usually slight or

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The prognosis depends on two main factors :—

(1) The severity of the cardiac involvement.

(2) The efficacy of the treatment.

The immediate prognosis depends chiefly on the severity of the attack, the incidence of pericarditis, and the extent to which the myocardium is affected. The occurrence of pericarditis, which is commonest in children, makes the prognosis much worse, and when this is accompanied by delirium the prognosis becomes very grave. A triple or gallop rhythm is not uncommonly found in cases of acute rheumatism, and indicates a badly affected heart muscle, and so long as this persists a favourable prognosis is doubtful. The remote prognosis depends on the number of valves affected, and on the extent of valvular damage, on the involvement or not of the pericardium, and on the condition of the myocardium.

In my opinion there is always some degree of mitral stenosis in all cases of mitral reflux of rheumatic origin, and the prognosis depends on the effect of the valve lesion towards an efficient circulation. The more marked the stenosis, the greater the tendency to a diminished left ventricular output and to stagnation of blood in the great veins. The presence of an aortic reflux in addition to mitral stenosis is considered to affect the prognosis adversely, but I do not think this is true in all cases. I have seen severe cases of mitral stenosis definitely improved by the occurrence of an aortic reflux. Also young people, whose main valvular rheumatic lesion is an aortic reflux, are often surprisingly well grown, and able to take part in strenuous exertion of all kinds without distress. An adherent pericardium has an adverse mechanical effect on the action—the extent depending on the degree to which the heart is anchored to the various adjacent structures. To overcome this mechanical disadvantage the heart enlarges and hypertrophies, and provided the adhesions

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aortic reflux, but a marked stenosis will tend to lessen the expected degree of collapse of the pulse. Aortic systolic murmurs not conducted into the neck are mainly due to roughening of the valve cusps. Pericardial involvement may occur in any severe attack of rheumatic fever, and is most commonly found in association with chorea. Its onset is suggested by a sudden rise of the fever, with exacerbation of the symptoms, i.e. increased pallor and dyspnoea, increased pulse-rate, and at times delirium. The presence of the latter makes the prognosis very serious. There is frequently severe praecordial pain at the onset, and a leathery friction rub is audible, chiefly over the base.

As in pleurisy, the condition may either clear up or effusion may take place, with relief of the pain and disappearance of the rub, but with increased dyspnoea and pulse-rate. The area of cardiac dullness increases both to right and left, and the apex beat may be obscured, and the sounds distant and muffled. X-rays show a typical pear-shaped shadow, with the heart apex pushed upwards and outwards. The effusion is non-purulent. If the patient survives, the effusion becomes absorbed, and the pericardial surfaces come together again with return of the friction, which is now crackling in character. Finally, adhesions between the two layers of the pericardium and between the parietal layer and adjacent structures take place to a greater or less extent, depending on the virulence of the infection and even more so on the efficacy or otherwise of the treatment. Extensive adhesions, especially those between the pericardium and the chest-wall, cause a marked mechanical impairment of the heart's action. Clinically they are easy to diagnose, but those of less extent may be suggested by a cardiac hypertrophy greater than anticipated from the valvular damage, by the presence of a pericardial knock or localized friction, and by impaired mobility of the heart apex.

RHEUMATIC HEART

The prognosis depends on two main factors :—

(1) The severity of the cardiac involvement.

(2) The efficacy of the treatment.

The immediate prognosis depends chiefly on the severity of the attack, the incidence of pericarditis, and the extent to which the myocardium is affected. The occurrence of pericarditis, which is commonest in children, makes the prognosis much worse, and when this is accompanied by delirium the prognosis becomes very grave. A triple or gallop rhythm is not uncommonly found in cases of acute rheumatism, and indicates a badly affected heart muscle, and so long as this persists a favourable prognosis is doubtful. The remote prognosis depends on the number of valves affected, and on the extent of valvular damage, on the involvement or not of the pericardium, and on the condition of the myocardium.

In my opinion there is always some degree of mitral stenosis in all cases of mitral reflux of rheumatic origin, and the prognosis depends on the effect of the valve lesion towards an efficient circulation. The more marked the stenosis, the greater the tendency to a diminished left ventricular output and to stagnation of blood in the great veins. The presence of an aortic reflux in addition to mitral stenosis is considered to affect the prognosis adversely, but I do not think this is true in all cases. I have seen severe cases of mitral stenosis definitely improved by the occurrence of an aortic reflux. Also young people, whose main valvular rheumatic lesion is an aortic reflux, are often surprisingly well grown, and able to take part in strenuous exertion of all kinds without distress. An adherent pericardium has an adverse mechanical effect on the action—the extent depending on the degree to which the heart is anchored to the various adjacent structures. To overcome this mechanical disadvantage the heart enlarges and hypertrophies, and provided the adhesions

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are only slight, can maintain an efficient circulation.

The heart is a pump, and the power of the pump is the heart muscle. A healthy heart muscle can overcome certain adverse factors, such as valvular defects and pericardial adhesions, by enlargement of its chambers and by hypertrophy; but this is not possible for an unhealthy muscle, which tends to enlarge by dilatation against the additional work put upon it. The one essential treatment is *rest*, and all others are subsidiary. It is only recently that the medical profession has begun to realize the necessity of prolonged rest for these cases of rheumatic carditis, and as yet the lay public have not grasped the fact that adequate rest is as important for these cases as for those suffering from pulmonary tuberculosis. I consider three to six months in bed, followed by very limited exercise for a further six months, is a fair average time for juvenile cases in whom there has been no serious cardiac damage. Afterwards they will be able to return to school under careful supervision, but will not be allowed to take part in any strenuous forms of exercise for at least another twelve months, and then only if the myocardium has completely recovered and the valve lesion is of slight degree. If there has developed mitral stenosis or aortic reflux they should not be permitted to play games, even when there are no symptoms and the tolerance to exercise is good. When the pericardium has been badly affected, especially if there is effusion, one cannot emphasize enough the vital importance of complete rest flat on the back for many months. With absorption of the fluid, adhesions will always tend to occur, and it is of the utmost importance to limit their extent by absolute rest, and to determine so far as possible that any anchoring of the pericardium to the chest-wall should be posterior, and that the heart should have free movement forwards and laterally.

RHEUMATIC HEART

Blisters, ice-bags, etc., will help to relieve the pain and discomfort in the acute stage, but can have little effect on the ultimate result. Paracentesis is rarely necessary, and should only be done where the amount of effusion is causing heart failure by direct pressure, and where the effusion persists and the patient is making no progress. In estimating the prognosis, it must be realized that there is a tendency to reinfection even after apparent recovery has taken place, especially where there is an unhealthy focus such as diseased tonsils, and, therefore, these should be removed as soon as the patient is convalescent. Apart from reinfection, there is a tendency to a gradual increase of the valve defect in cases of mitral stenosis, but the progress is slow and takes many years. There are two serious eventualities, occurrence of which in cases of chronic valvular disease has to be reckoned with, namely, embolism, cerebral or pulmonary, in mitral stenosis, and infective endocarditis. The former results in death or in greatly impaired health, and the latter is an invariably fatal condition.

As regards drugs, salicylates have a specific action on the rheumatic virus, though whether the occurrence of valvular disease is lessened is debatable. Personally, I believe that their proper use has diminished the occurrence of some of the more serious complications such as severe pericarditis. Cardiac tonics, such as digitalis, are by many considered contra-indicated in acute rheumatism, but I should not hesitate to prescribe them where failure of compensation has occurred or is imminent. In convalescence general tonics are given to combat the anaemia and debility. I have purposely not discussed the electrocardiographic findings of the various cardiac conditions, but should like to emphasize the value of the electrocardiograph, not only in helping to substantiate the diagnosis, but also in assessing the degree of myocardial involvement.

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PATHOLOGY.

Only a brief reference to some of the outstanding features is attempted. Acute gastric or duodenal erosions, causing brisk haemorrhage and healing promptly, may be explained by embolic or anaemic devitalization, followed by digestion, of a small area of mucosa. Chronic ulcer, on the other hand, originates as a blood-borne infection selectively deposited in a certain part of the stomach or the duodenum, possibly in the submucous lymph nodes; there is a specific predilection for certain parts—the lesser curvature and the pyloric area—which are also functionally distinct. The formation of the ulcer, and its extension, are dependent on the action of gastric secretion on a devitalized area; but the activity of the ulcer, both as regards symptoms and extension, must be regarded as due primarily to inflammatory recrudescences in the surroundings (witness the signs always present around a perforated ulcer). The condition is a gastritis, a cellulitis of the subserous, muscular and submucous coats; it is always found when ulcer is operated on during its symptomatic phase—there is the familiar induration, rigidity, glistening oedema with fragile capillaries that rupture readily on rubbing (during a quiet period there is still an ulcer, but no cellulitis to interfere with the motor function; if there is fixation to the pancreas, symptoms persist in the absence of cellulitis and are due to the fixation alone). In many cases with stasis there is diffused inflammatory affection of the mucous lining, which may ultimately lead to

The Treatment of Gastritis Ulcerans.

By C. JENNINGS MARSHALL, M.S., M.D., F.R.C.S.
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for Children.*

THE great attention nowadays devoted to the discussion of the treatment of gastroduodenal ulceration is indicative equally of the prevalence of the condition and of the unsatisfactory results attained by most methods. A review of the attitude generally adopted can scarcely fail to impress one with the fact that practically without exception the ulcer is regarded as the only object of attack, that it is the *fons et origo* of the symptoms; and also that the pathological conception at the basis of treatment is dominated by purely chemical considerations. In other words, gastric ulcer is merely a chronic sore in the stomach, whose production, progress and healing are governed (rather strangely) by one of the constituents of gastric secretion, on whose condition the diagnosis and symptoms largely depend. It can be stated emphatically that as long as this idea persists as the basis of therapeutics, no real progress is possible.

There are many "stock diagnoses" to apply to symptoms that are with difficulty explained, for example, rheumatism, neuritis and the like; we are familiar with the tendency to label all dyspepsias "gastritis," and equally so with the frequency with which such cases are demonstrated often by a perforation, to be ulcers. It would appear, however, that, albeit by chance, the original diagnosis is, after all, a view that is fundamentally more correct, and that the ulcer is but an incident in a more widespread gastric lesion. The idea that the pain of gastric or duodenal ulcer is

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due to a hyperacid juice stinging the sore has long gone by the board, and has been replaced by the conception that, apart from those of extragastric extension (e.g. to the pancreas or liver), the symptoms are dependent upon interference with the motor function of the organ.

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an atrophic condition with diminished secretion and loss of appetite.

A common type of case presents the periodic dyspepsia, etc., of ulcer, often with brisk haemorrhage, where the most minute examination fails to reveal an ulcer; the history of haemorrhage may lead the search even to the extent of opening the viscus, when a succulent gastritis (which one has often confirmed microscopically) is revealed, the mucosa bleeding readily on rubbing. The coats of the organ show a non-indurative œdema and culture from them may yield streptococci or coliform organisms. There is commonly an anaemia, obviously explained, which cannot be dependent on a remote or negative history of haemorrhage. The condition seems to constitute a clinical entity, *infective haemorrhagic gastritis*, which it is most important to recognize.

The most trying of gastric problems is the case of gastro-enterostomy "gone wrong." Gross ulceration at the site of anastomosis is not common—much more frequently there is an infective gastritis affecting all coats, extending for a variable distance from the union. Most of such complications are predisposed to, or initiated by, technical errors in this far too lightly regarded operation, but it can scarcely be doubted that infection here too plays a predominant part.

The presence of bacterial infection, it should be remembered, gives rise to symptoms apart entirely from the local disturbances; a great many cases present a chronic toxæmia and an anaemia not dependent upon loss of blood. The removal of this toxæmia by gastrectomy produces a general, often profound, improvement in health that is not to be explained solely by the restoration of painless digestion.

TREATMENT.

This digression into pathology would appear necessary

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in view of the widespread focusing of all therapeutic attention on the "sore" and the "acidity."

The source of infection is only occasionally the gall-bladder or the appendix—one has in some cases been able to demonstrate a chain of obviously diseased lymph glands extending from a grossly infected appendix up to the subpyloric region. But appendectomy as a cure for all and sundry dyspepsias is rightly discarded. Sometimes there is a urinary focus—pyelitis is not infrequent, and one has seen pyonephrosis and gastric ulcer in the same patient (but the ulcer was not cured by nephrectomy). Naso-pharyngeal infections, notably in the adult tonsil, are often overlooked. Many cases are dependent on dental sources, yet here, as is notorious, great disappointment lies, for many reasons. The implantation of infection in the site of predilection in the stomach takes place via the bloodstream, not by ingestion; the natural gastric antisepsis is nearly always efficient in cases developing ulcer. The type of dental disease giving rise to this is not the obvious pyorrhœa, but apical infections, and the failure to realize this is responsible for the myriads of people who have been unsuccessfully edentulated, not only for gastric, but hosts of other disorders (this, of course, without prejudice to the proposition that pyorrhœa should be treated). Given, however, that all foci of infection have been eliminated, one is confronted by the evident fact that shutting the stable door does not bring the horses back. An active infection of the stomach wall is not commonly cured by removal of the primary focus, and it is probable that recrudescence of inflammation is less likely to be due to reinfection than to persistence of infection. Nevertheless, despite disappointments in the majority of cases, on general grounds alone, it is eminently desirable to free the patient from all foci; the local infection may die out, reinfection is prevented, and in

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any case the operative importance is obvious.

In deciding on the form of treatment, mechanical considerations must be weighed; where, as is the case in perhaps a quarter of instances, there is midgastric or pyloric stenosis, or a large extragastric cavity, or where it is evident from the symptoms that severe perigastric adhesion has occurred, surgical intervention becomes essential to cure, although in one's opinion it is desirable to tide the patient medically into a quiet interval. Similarly, any suspicion of the development of carcinoma will determine exploration; there is a well-justified revolt against the high figures given by some authorities for previous simple ulceration in carcinoma, but that the relationship exists in an appreciable proportion cannot be denied, and the argument is the more weighty as it is carcinoma originating in ulcer that gives the best chance of surgical cure. The repeated failure of medical treatment, and recurrent haemorrhage, also form surgical indications (though again, in the latter instance, the immediate treatment is preferably medical). Another consideration weighing with the patient is the prospect that after prolonged medical treatment surgery may still be necessary, and such an argument is of much importance to the weekly bread-winner. It is easy to say that if such and such a system is followed relapse is prevented and cure obtained (in any case a questionable thing); the only dependable factor in the treatment of disease is that, with the majority of patients, there is a certainty that as soon as symptoms disappear cure is regarded as present, and pious resolutions go sky-high. Much can always be said in favour of any treatment that does not demand "the intelligent co-operation of the patient!"

The majority of cases, however, will elect medical treatment; apart from very cogent reasons, operations are not accepted eagerly except by chronic sufferers utterly disgruntled by dietetic restrictions and relapses.

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Yet it must surely be agreed that to endure some of the systems in vogue, an endurance is called for in the patient (and the nursing staff) compared with which the resolve to have an operation is a mere bagatelle.

Medical treatment is an adaptation of the surgical principle of giving rest to an inflamed and infected part, and consists in (1) a rigorous regime for the active phase, best conducted in bed, and (2) in the observance for an indefinite period of a dietary.

(1) The feeds are small and frequent, and for the beginning a mere subsistence; they are cold and fluid, all elements calculated to excite secretion and peristalsis being eliminated. Alkalizers, nowadays employed in large doses—notably magnesia, bismuth carbonate, etc.—with the idea of keeping the stomach perpetually antacid, have the main effect of securing rest (it is interesting to note the abandonment of the more powerful alkalizers in view of the chemical theory of treatment); belladonna and olive oil between feeds again act similarly. The foodstuffs available are milk, cream, eggs and dry biscuits; there is little advantage in one system over another so long as the principle of gastric rest is observed. Anything enjoyed by the patient should be suspect—his object is to attain a dietetic Nirvana.

(2) A similar principle should govern the working dietary: appetite must be broken, the patient must have only a limited use of his stomach. The old prohibitions still hold—roasts, rich gravies, pickles, spices, smoking, salted articles and spirits. The use in general of coarse articles is undesirable. The less appetizing the diet the better; meals should be small, and alkalinizing powders taken between meals. These prohibitions are indefinite in duration; it is not possible to fix any time at which it can be promised the ulcer will be healed, and healed beyond relapse. Such restrictions possibly result in a better dietary than normal in

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operative risks are low, given special experience, skilful anaesthetization, gentle and quick operating. The results compared with those obtained by "tinkering" about with an infected stomach are incomparably superior; the freeing of the patient from the chronic toxæmia has already been alluded to; the fundus of the stomach soon tolerates an adequate meal, and weight is rapidly gained. The cancer argument has also some force in favour of excision in preference to other methods.

In the case of gastro-enterostomy "gone wrong," gastrectomy is the only satisfactory procedure, reconstruction either of the *status quo* or of the gastro-enterostomy being futile. The radical operation here may prove one of the most formidable in surgery, and one that should never be lightly undertaken. Its results, however, are most striking.

In the rare cases, extensive ulceration combined with severe infection may demand treatment by complete gastric rest, to be obtained by jejunostomy; this will after a month or so tide the patient into a condition in which curative treatment may be carried out, but the maintenance of nutrition may prove very difficult.

Until the specific therapy of infections has advanced considerably, the treatment of gastric ulcer, like numerous other therapeutic problems, can scarcely reach a more satisfactory position.

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sedentary workers, but one which is scarcely adequate in those doing heavy work.

The details of surgical measures in the treatment of gastric or duodenal ulcer must be determined at exploration by careful estimation of the pathology of the individual case; there can be no routine procedure. Gastro-enterostomy has its greatest usefulness in cases of stenosis in the pyloric region, i.e. when performed for its original, mechanical indication. Preferably it should be combined with local attack on any active ulceration present, e.g. infolding, cauterization or excision, and this is commonly the method employed in gastric ulcer also, excision being by the wedge or sleeve method. A consideration of the pathology will show why such operations prove so disappointing, and why relapses with often gravely increased symptoms are frequent, after a spell of relief that may last three months or more. As already indicated, many of these failures are due to errors of technique or of judgment. In certain selected cases simple excision of the ulcer may be performed. Gastro-enterostomy has a definite place, as stated, for obstruction, and also as a temporizing measure, preliminary to radical treatment. There can be no doubt but that the best results by far are obtained by partial gastrectomy, and this should be regarded as the operation of choice in penetrating ulcer; to perform a short circuit alone is to go far towards justifying the cynical saying, "Gastro-enterostomy is not an operation, it is a disease." The radical treatment by removal of the ulcerable area (partial gastrectomy) must unfortunately remain a much less universally employed method, as its technical demands are of an infinitely more exigent character than those of the other gastric operations; it will be clear, however, that it is unjustifiable to operate for gastric disease unless one is prepared, whenever the indications are present, to undertake radical treatment. The

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The Treatment of Gastric and Duodenal Ulcers by Duodenal Feeding.

By ERNEST YOUNG, M.D.

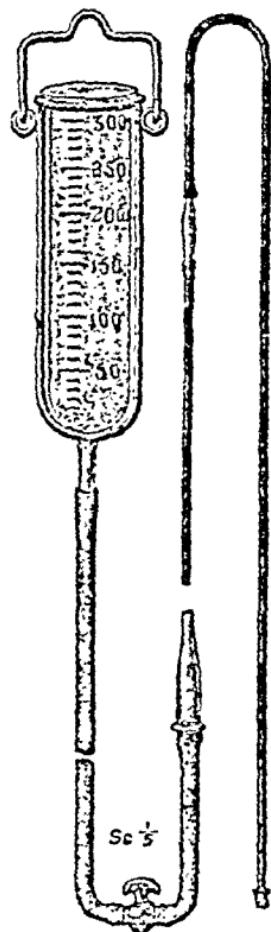
*Senior Physician, Kensington General Hospital; Honorary Physician,
Farringdon General Dispensary.*

THE object of this article is to bring to notice a medical method of treatment of gastric and duodenal ulcers which I feel has not been sufficiently recognized in this country, namely, "Feeding by the duodenal tube." Briefly, the method consists in passing a small rubber tube into the duodenum and retaining it there for eighteen days. During this time, which may be termed the period of active treatment, the patient receives through the tube eight liquid feeds each day at two-hourly intervals. The rationale of the treatment may be summed up in one word—"rest." The stomach is spared the work of digestion, and, since no food passes over the surface of the ulcer, it is kept free from irritation and given a chance of healing.

I need not enter fully into the history of the method; suffice it to say that it was introduced by Max Einhorn, of America, and has since been employed extensively by several of the leading physicians in that country. So far as this country is concerned, however, although the duodenal tube has been used for several years for purposes of diagnosis, its therapeutic value for duodenal feeding has not received the recognition it deserves. For the last few years I have employed this method in most of my private cases of peptic ulcers and it has given me better results than any other form of

medical treatment. I think I can show in this article in THE PRACTITIONER (which is based upon a lecture given at the Post-graduate Course, St. Mary's Hospital) that it is quite a simple form of treatment, and one which may be undertaken successfully by the general practitioner.

Feeding apparatus.—The apparatus required is, as indicated in the illustration, quite simple in character. It consists of two parts: a fine rubber duodenal tube, and a small irrigator supported by a wire holder. The duodenal tube, which is 47 in. in length, consists of a thin rubber tube (No. 6 drainage tubing) terminating in a small perforated silver-plated capsule. The tube is marked with two black rings, 23 and 30 in. from the tip, and has a glass "window" insertion 40 in. from the tip for purposes of observation. When not in use the proximal end of the tube is closed with a bone plug to prevent leakage. The irrigator consists of a glass container of 300 c.cm. capacity with attached rubber tubing 4 ft. in length. The tubing is furnished with a vulcanite stopcock to regulate flow, and terminates in a tapering glass nozzle which fits into the proximal end of the duodenal tube when a feed is to be given. The irrigator may be hung on a stand, or, if a stand is not available, it may be attached to the top of a screen around the head of the bed or to a nail in the wall, care being taken that the base of the glass container is about 3 ft. above the level of the bed—this will give quite sufficient pressure. Since the duodenal tube is retained in the gastro-intestinal tract for eighteen



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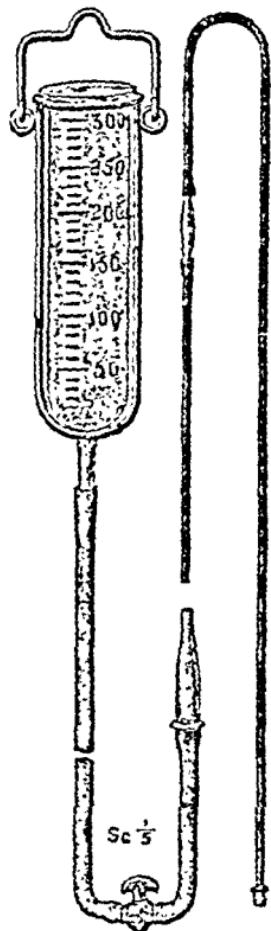
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Feeding apparatus.—The apparatus required is, as indicated in the illustration, quite simple in character. It consists of two parts: a fine rubber duodenal tube, and a small irrigator supported by a wire holder. The duodenal tube, which is 47 in. in length, consists of a thin rubber tube (No. 6 drainage tubing) terminating in a small perforated silver-plated capsule. The tube is marked with two black rings, 23 and 30 in. from the tip, and has a glass "window" insertion 40 in. from the tip for purposes of observation. When not in use the proximal end of the tube is closed with a bone plug to prevent leakage. The irrigator consists of a glass container of 300 c.cm. capacity with attached rubber tubing 4 ft. in length. The tubing is furnished with a vulcanite stopcock to regulate flow, and terminates in a tapering glass nozzle which fits into the proximal end of the duodenal tube when a feed is to be given. The irrigator may be hung on a stand, or, if a stand is not available, it may be attached to the top of a screen around the head of the bed or to a nail in the wall, care being taken that the base of the glass container is about 3 ft. above the level of the bed—this will give quite sufficient pressure. Since the duodenal tube is retained in the gastro-intestinal tract for eighteen



The Treatment of Gastric and Duodenal Ulcers by Duodenal Feeding.

BY ERNEST YOUNG, M.D.

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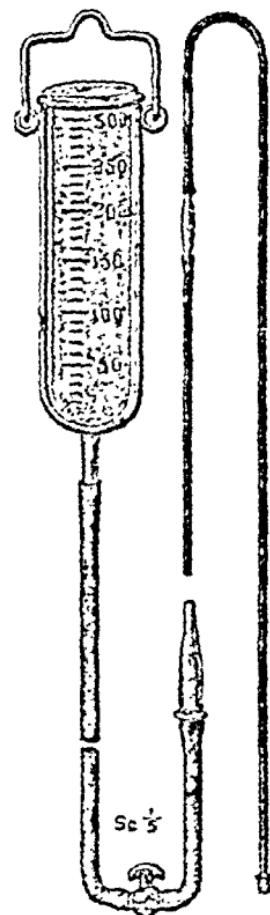
THE object of this article is to bring to notice a medical method of treatment of gastric and duodenal ulcers which I feel has not been sufficiently recognized in this country, namely, "Feeding by the duodenal tube." Briefly, the method consists in passing a small rubber tube into the duodenum and retaining it there for eighteen days. During this time, which may be termed the period of active treatment, the patient receives through the tube eight liquid feeds each day at two-hourly intervals. The rationale of the treatment may be summed up in one word—"rest." The stomach is spared the work of digestion, and, since no food passes over the surface of the ulcer, it is kept free from irritation and given a chance of healing.

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days, it is important that it should be as soft and of as fine a calibre as is compatible with efficiency. I have found that No. 6 tubing is as near the ideal as is possible; the ordinary duodenal tube used for purposes of analysis is too thick and firm to be retained with comfort by the patient for more than a few hours.

Introduction of the duodenal tube.—The duodenal tube is usually passed in the early morning upon a fasting stomach and with the patient in a sitting-up position. The procedure is as follows: The tube is moistened with warm water and the tip is then guided by the finger over the centre of the tongue into the pharynx. The patient now sips a little warm water and is told to swallow. As soon as the tube enters the oesophagus it will, with repeated swallowing, aided if necessary by further sips of water, generally pass without difficulty into the stomach. When this takes place and the 23 in. mark reaches the teeth, the proximal end of the tube must be closed with the bone plug to prevent leakage. The patient now sips one-third of a tumblerful of water and lies on the right side, holding the tube loosely between the lips and giving a slight swallow about every ten minutes until the 30 in. mark is level with the teeth. During this time, if all has gone well, the peristalsis of the stomach will have forced the tip of the tube through the pylorus into the duodenum. This may take from twenty minutes to several hours, but as a rule, provided there is no pyloric obstruction, the tip of the tube reaches the duodenum within an hour. At the end of an hour tests may be made to determine whether the tube is in the duodenum. This is accomplished by fixing a 10 c.cm. Record syringe to the proximal end of the tube and aspirating. If the fluid returned is clear golden yellow, in other words, bile, or thick and opaque and of alkaline reaction, we may conclude that the tube has reached the duodenum. If, on the other hand, the fluid returned is watery and

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acid in reaction it indicates that the tip of the tube has not passed out of the stomach. Another distinction is that fluid from the stomach returns easily, while from the duodenum it generally returns slowly, drop by drop, and the tube adjacent to the syringe becomes collapsed. When for any reason it is not certain that the tube is in the duodenum—as in cases of achlorhydria, where the reaction of the fluid is no guide—a decisive test, as suggested by Einhorn, is to make the patient swallow a few mouthfuls of milk and then aspirate immediately. If the tip of the tube is in the stomach the milk appears at once; it obviously does not appear if the tip is in the duodenum.

If from one or more of the above tests it is manifest that the tip of the tube has not left the stomach, the tube is withdrawn to the 23 in. mark and another test is made in an hour's time. If, however, the tip is proved to have reached the duodenum, the proximal end of the tube may be connected with the nozzle of the irrigator and feeding commenced forthwith. Taking the average distance from the teeth to the pylorus to be 22 to 23 in., it will be noted that, when the tube is definitely engaged in the duodenum and the 30 in. mark is level with the teeth, the proximal end of the tube is 17 in. outside the mouth, while the tip of the tube will be extended about 7 in. beyond the pylorus, and therefore well beyond the usual site of a duodenal ulcer.

Food.—Eight feeds are given daily at two-hourly intervals, starting at 8 a.m. Einhorn's standard diet for each feed consists of one raw egg and a tablespoonful of lactose beaten up with 8 oz. of milk. I prefer to omit the lactose and give only four eggs a day, my present practice being to give alternately one raw egg beaten up with 8 oz. of milk, and 8 oz. of Benger's food, with a tablespoonful of cream. The patient thus obtains during the day 4 eggs, 64 oz. of milk and 2 oz. of

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cream, which is ample to provide adequate nutrition. Very occasionally patients are met with who say that they cannot take milk. In one such case where ordinary milk seemed to disagree I substituted artificial (soya bean) milk, which was taken without discomfort. Other liquid foods, such as clear soup, beef juice or extract, fruit juices, emulsions of nuts, etc., have been suggested; but when dealing with peptic ulcers I think it desirable to adhere exclusively to the egg-and-milk diet I have mentioned. Generally, the appetite is keen and patients look forward to their food, but should any sense of satiety be experienced the 10 p.m. feed may be omitted. Some patients undoubtedly do better on seven feeds a day. The period of duodenal feeding suggested by Einhorn extends from two to three weeks. I have found that eighteen days is a good average time, and I now make this the definite period for all cases.

The essential points to be observed in this method of feeding may be summarized as follows:—

1. The glass container of the irrigator should be hung about 3 ft. above the level of the bed.
2. The vulcanite stopcock must be adjusted so that each feed takes not less than ten minutes to pass through the tube. If it passes too quickly it will cause discomfort.
3. Each feed must be strained through gauze in order to free it from thick particles which might block the tube, and should be given at body temperature.
4. After each feed the duodenal tube must be detached from the irrigator and a syringeful of water followed by a syringeful of air passed down it in order to keep it clear. It is then closed with the bone plug to prevent leakage.

5. The irrigator must be thoroughly cleansed with cold water after each feed.

It is essential also to keep the tongue and mouth clean by the use of a simple mouth-wash three or four

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times a day.

After the last feed on the evening of the eighteenth day the tube is withdrawn, and next morning light, solid food is commenced. For breakfast at 8.30 a.m., I usually give a scrambled egg, rusks in the form of breakfast biscuits, a little butter, and at the end of the meal a teacupful of China tea with milk, but without sugar. For lunch at 1.30 p.m., boiled fish, sieved potato, rusks, baked custard, half a tumblerful of water. For tea at 5 p.m., two teacupfuls of China tea and a few plain biscuits. For dinner at 7.30 p.m., breast of chicken, sieved potato, rusks, junket and cream, half a tumblerful of water. One hour before breakfast and lunch, and at 10.30 p.m., a tumblerful of hot water.

After four or five days the diet may be gradually increased and varied; thus, two boiled, poached or scrambled eggs, or thin slices of cold boiled bacon may be taken for breakfast, and stale white bread substituted for rusks; tender beef or mutton can also be taken occasionally at lunch and dinner as a change from fish or chicken, and plain boiled instead of sieved potatoes. In this way the patient may slowly return to a more or less normal diet within a month. It is advisable, however, for a space of about two or three months to forbid all fruit, either raw or stewed, and to permit a second vegetable only if passed through a sieve.

At first, the tube may cause some feeling of soreness in the cesophagus, but this seldom lasts for more than a day. Only in one of my cases was this soreness so pronounced as to necessitate the abandonment of the treatment. The pain from a gastric ulcer usually clears up during the first day of treatment, and does not return. The same result generally takes place in duodenal ulcer, but I have had some cases where duodenal discomfort occurred shortly after feeding. In the latter event an eggspoonful of alkaline powder

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DUODENAL FEEDING

DUODENAL ULCERS—*continued.*

Name.	When treated.		Result.
5. Mr. S.	Dec.	1925	No recurrence of symptoms.
6. Mr. M.	Dec.	1926	No recurrence of symptoms.
7. Mr. B.	March	1927	No recurrence of symptoms.
8. Mr. K.	April	1927	No recurrence of symptoms.
9. Mrs. M.	June	1927	Symptoms recurred five months later. Operation advised.
10. Mr. T.	July	1927	No recurrence of symptoms.

Of the seven cases of gastric ulcer, No. 2 was a failure. No. 4 remained free from symptoms for three months prior to going abroad, and has since been lost sight of. Three others (Nos. 1, 3, 5) who have had no recurrence of symptoms for periods ranging from over four years to one year and eight months may be regarded as cured. The remaining cases (Nos. 6 and 7) are of too recent date for any definite expression of opinion.

Of the ten cases of duodenal ulcer, so far only two (Nos. 4 and 9) have relapsed. Four cases (Nos. 1, 2, 3, 5) have been free from symptoms for periods ranging from four to two years, and may therefore be regarded as cured. The remaining four cases (Nos. 6, 7, 8, 10) have been treated too recently for any opinion to be passed as to the final result, but, since they have been free from symptoms up to the present, the outlook is hopeful.

In conclusion, the chief advantages of this method may be summed up as follows. The patient receives adequate nourishment from the commencement of treatment, and there is therefore seldom any loss, and not infrequently a gain, in weight and strength. The short duration of the treatment is also greatly in its favour and is encouraging to the patient, who knows beforehand that he will be confined to bed (and even then not entirely) for but eighteen days, and will be able to be up and about within three weeks.

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mixed with a little water and passed down the tube after each feed will usually be sufficient to clear up the symptoms. Further medication, other than a liquid aperient if necessary, is seldom required, but when a patient is obviously anaemic a daily hypodermic injection of iron and arsenic may be given with advantage. During the period of active treatment the patient may rise from bed for toilet purposes, and may have a warm bath, if taken gently, every other day. From the fourteenth day he may sit in an arm-chair for an hour or so a day, and on the nineteenth day for three hours. He may get up entirely on the twenty-first day.

Results.—Of the cases I have treated by this method the results as indicated below are distinctly encouraging. With one exception (No. 2 gastric) the diagnosis in all cases was confirmed by a barium meal X-ray examination before treatment was commenced.

GASTRIC ULCERS.

Name.	When treated.		Result.
1. Mrs. L.	Sept.	1923	No recurrence of symptoms.
2. Mr. C.	Jan.	1924	Failure. Partial gastrectomy subsequently performed.
3. Mr. M.	July	1924	No recurrence of symptoms.
4. Mr. G.	Nov.	1926	No recurrence of symptoms.
5. Mr. S.	May	1926	No recurrence of symptoms.
6. Mrs. S.	Jan.	1927	No recurrence of symptoms.
7. Mrs. D.	April	1927	No recurrence of symptoms.

DUODENAL ULCERS.

Name.	When treated.		Result.
1. Capt. B.	Dec.	1923	No recurrence of symptoms.
2. Mr. W.	May	1924	No recurrence of symptoms.
3. Mr. B.	Feb.	1925	No recurrence of symptoms.
4. Mr. R.	Nov.	1925	Failure. Recurrence of symptoms eleven months later. Operation advised.

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subsiding and the discharge is becoming less.

Since in chronic otorrhœa the basic factor keeping up the discharge is a septic fluid irritating the walls of the tympanum, the line of treatment indicated is to remove that septic fluid by absorption, or to apply an antiseptic which will make the fluid adhering to the walls a bad culture medium for bacteria and so render it non-irritating. The walls of the tympanum being then freed from irritation will cease to secrete fluid, and so the condition will clear up.

The subjoined table summarizes the lines of treatment to follow based on the indications present in an ear :

<i>Cause of Chronicity.</i>	<i>Treatment.</i>
i. Accessible sepsis, e.g. tympanic sepsis.	In slight cases, insufflation of boracic powder. In more severe cases, zinc ionization with or without boracic powder insufflation.
ii. Accessible sepsis with second factor in ear, e.g. polypus.	Remove second factor, then ionize ear.
iii. Accessible sepsis with inflammation in a neighbouring organ, e.g. rhinitis.	Treat neighbouring organ and ionize ear.
iv. Inaccessible sepsis. (a) Accessible with difficulty, e.g. cell in mastoid opening into tympanum or posterior meatal wall;	Use special instruments to gain access (a) attio canula; (b) gelatine covered wire.
(b) Totally inaccessible, e.g. most cases of attic and mastoid disease.	Make area of sepsis accessible by operation and then use ionization

Zinc ionization, strictly speaking, is not a remedy for chronic otorrhœa, but rather a method of treatment which is applicable to a septic cavity when that cavity is readily accessible. As so many cases of chronic otorrhœa are kept up by sepsis in the tympanum, it follows that zinc ionization is useful in that condition. Moreover, as the results are so consistently good in cases of tympanic sepsis, we have a clue as to how to deal with other cases. Thus, when there is a factor, e.g. a polypus, present besides sepsis, keeping up the suppuration, we should remove this additional factor and

The Treatment of Otorrhœa in School Clinics.

BY A. R. FRIEL, M.D., F.R.C.S.I.

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In considering the subject of the treatment of school children for otorrhœa, it is necessary to discuss two questions: (1) How to treat each individual case of otorrhœa; and (2) how to use the facilities at our disposal so as to get the largest possible number of cases treated. Cases of otorrhœa due to middle ear disease are divided into two classes—namely, acute suppurative otitis media, and chronic suppurative otitis media (a third might perhaps be added—an acute attack supervening in an ear with chronic otorrhœa). In the acute condition, the tissues are attacked by bacteria: usually a pneumococcus or a streptococcus. In the chronic condition the tissues have repelled the invaders, but the discharge has become a fluid swarming with bacteria and irritating the tissues with which it is in contact.

In the treatment of the acute attack the line to follow is to assist the tissues by conserving the energy of the patient by rest in bed if possible; to relieve pain by warmth and moisture applied to the side of the head; to encourage a flow of serum from the ear by the use of glycerine drops; and finally to use every endeavour to prevent the fluid in the ear becoming a culture medium for saprophytes. This can be done by absorbing the discharge with boracic lations when the acute inflammation is

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ii. Accessible sepsis with second factor in ear, e.g. polypus.	Remove second factor, then ionize ear.
iii. Accessible sepsis with inflammation in a neighbouring organ, e.g. rhinitis.	Treat neighbouring organ and ionize ear.
iv. Inaccessible sepsis.	
(a) Accessible with difficulty, e.g. cell in mastoid opening into tympanum or posterior meatal wall;	Use special instruments to gain access (a) attic canula; (b) gelatine covered wire.
(b) Totally inaccessible, e.g. most cases of attic and mastoid disease.	Make area of sepsis accessible by operation and then use ionization

Zinc ionization, strictly speaking, is not a remedy for chronic otorrhœa, but rather a method of treatment which is applicable to a septic cavity when that cavity is readily accessible. As so many cases of chronic otorrhœa are kept up by sepsis in the tympanum, it follows that zinc ionization is useful in that condition. Moreover, as the results are so consistently good in cases of tympanic sepsis, we have a clue as to how to deal with other cases. Thus, when there is a factor, e.g. a polypus, present besides sepsis, keeping up the suppuration, we should remove this additional factor and

The Treatment of Otorrhœa in School Clinics.

By A. R. FRIEL, M.D., F.R.C.S.I.

Aurist to Tottenham, Walthamstow and Hornsey Education Authorities; late Assistant Surgeon, Metropolitan Ear, Nose and Throat Hospital, etc.

In considering the subject of the treatment of school children for otorrhœa, it is necessary to discuss two questions: (1) How to treat each individual case of otorrhœa; and (2) how to use the facilities at our disposal so as to get the largest possible number of cases treated. Cases of otorrhœa due to middle ear disease are divided into two classes—namely, acute suppurative otitis media, and chronic suppurative otitis media (a third might perhaps be added—an acute attack supervening in an ear with chronic otorrhœa). In the acute condition, the tissues are attacked by bacteria: usually a pneumococcus or a streptococcus. In the chronic condition the tissues have repelled the invaders, but the discharge has become a fluid swarming with bacteria and irritating the tissues with which it is in contact.

In the treatment of the acute attack the line to follow is to assist the tissues by conserving the energy of the patient by rest in bed if possible; to relieve pain by warmth and moisture applied to the side of the head; to encourage a flow of serum from the ear by the use of glycerine drops; and finally to use every endeavour to prevent the fluid in the ear becoming a culture medium for saprophytes. This can be attained by absorbing the discharge with boracic powder insufflations when the acute inflammation is

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subsiding and the discharge is becoming less.

Since in chronic otorrhœa the basic factor keeping up the discharge is a septic fluid irritating the walls of the tympanum, the line of treatment indicated is to remove that septic fluid by absorption, or to apply an antiseptic which will make the fluid adhering to the walls a bad culture medium for bacteria and so render it non-irritating. The walls of the tympanum being then freed from irritation will cease to secrete fluid, and so the condition will clear up.

The subjoined table summarizes the lines of treatment to follow based on the indications present in an ear :

Cause of Chronicity.

Treatment.

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ii. Accessible sepsis with second factor in ear, e.g. polypus.	In more severe cases, zinc ionization with or without boracic powder insufflation.
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TREATMENT OF OTORRHOEA

the writer uses the electrode illustrated. The tip of the twisted silk-covered wire is prevented from actually touching the walls by a blob of gelatine, and the current is prevented from issuing anywhere except at the tip by covering the remainder with an insulating cellulose varnish. To destroy polypi or large granulations or a small area of drum at the upper posterior part which prevents access to the incus area, the instrument illustrated is convenient. As a local anaesthetic, where the tissue is sensitive, Bonain's fluid can be recommended.

When making up a synopsis of the conditions in a number of ears and of the results of treatment, it is not possible to give information on every point, but it is possible to give much useful information by specifying the conditions present in the ears and by classifying the results obtained. A table is appended showing these for the year 1927 in a clinic which has been in existence for four years. When it was started there was a large accumulation of chronic cases to be worked off and new cases were continually being added, so that it was impossible to deal with acute cases as they arose. It took two years before the waiting list could be worked through. Now there is no waiting list and has not been for a considerable time, consequently it is possible to see the acute cases as soon as they are notified and to treat them forthwith, with the result that nearly every case can be prevented reaching the chronic stage.

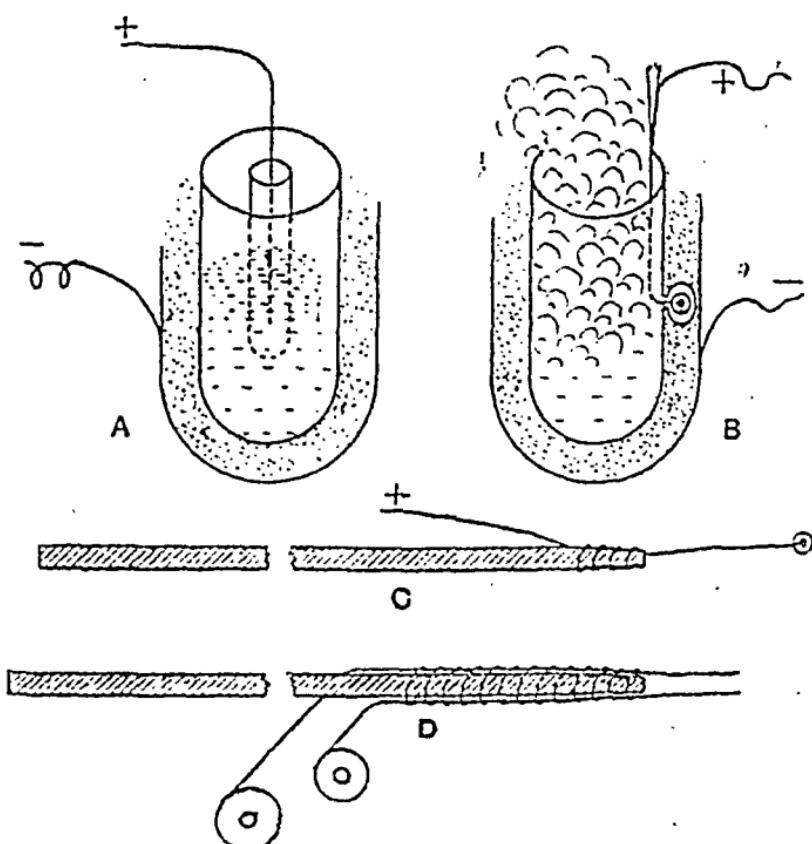
In 1924 and 1925, taken together, 213 ears were treated, of which 6 only were acute; in 1926, 181 ears were treated, of which 27 were acute; in 1927, 204 ears were treated, of which 92 were acute.

The policy followed at Bruce Castle, Tottenham, where the school population is 25,000, is to send all cases of otorrhœa to the weekly aural clinic as soon as discovered. In cases of chronic otorrhœa the children do not receive any treatment in the intervals between their

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then treat the sepsis with ionization; when the sepsis is in a position difficult of access, we should use special instruments to reach it; and when the septic area is totally inaccessible as in most cases of attic and mastoid disease, we should do an operation to make it accessible.

Every now and again cases are met with in which there is suppuration in a cell or recess in the posterior wall communicating with the tympanum or external meatus. The cell can be washed out by means of an attic canula and then filled with the zinc solution by the same means. To convey the electric current to the fluid



(A) It is easy to ionize a simple cavity. Cleanse it, fill it with the zinc solution, insert into the fluid a zinc wire, taking care that it does not touch the wall of the cavity, and apply the negative electrode externally. (B) Where there is a cell communicating with a cavity, the ionization has to be done in two stages—the general cavity and the cell. (C) The tip of the electrode used in B is prevented from touching the wall of the cell by a blob of bare gelatine. The rest of the electrode is insulated. (D) Electrode for the treatment of polyp. The projecting ends of the two zinc wires are insulated with cellulose varnish except at the tips.

Acute Generalized Septic Peritonitis following Acute Appendicitis in the Child.

By RUTH ELIZABETH MILLAR, M.B., F.R.C.S.E.

AND

GEORGE ROBERTSON, F.R.C.S.E.

Hon. Surgeon, Dunfermline and West of Fife Hospital.

IT has been the unfortunate experience of most surgeons to meet this neglected type of case. A child four or five years of age arrives in hospital, *in extremis*, with a history of several days' illness, during the latter two or three of which persistent vomiting has been a prominent feature of the case. The extremities are cold and bluish, the pulse very rapid and feeble; the restlessness of the child intensifies its already tired and anxious look. The whole abdomen is distended, tender and rigid, and altered blood is vomited frequently in small quantities. The vomit is not forcibly ejected, because the already rigid abdominal muscles give little assistance to the act of vomiting. The breath and vomit smell strongly of acetone. The child, mildly delirious, is rapidly dying. The prognosis by operation is bad. The writers wish to record in THE PRACTITIONER a method of treatment offering in these almost hopeless cases a prospect of success.

The evacuation of the pus and the removal of the gangrenous perforated appendix—which nearly always in such cases lies free and floating in the exudate—is

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TOTTENHAM OTORRHOEA STATISTICS FOR 1927.

Cause of Suppuration.	Total.	Cured.	Lost sight of.	Still under Treatment.	Needing Hospital.
Acute suppurative otitis media ..	92	85	1	5	1
Chronic otorrhœa due to Tympanic conditions :					
(a) Tympanic sepsis	46	44	1	1	—
(b) Tympanic sepsis + granula- tions	7	4	2	1	—
(c) Tympanic sepsis + polypus	7	3	1	3	—
Tympanic conditions : + Pharyngitis	1	1	—	—	—
+ Rhinitis	3	2	1	—	—
Tympanic conditions : + Attic disease	14	6	2	3	3
+ Mastoid disease	12	3	—	1	8
External otitis ..	20	17	2	1	—
Cause undetermined	2	1	1	—	—
	204	186	11	15	12
Percentage	100 %	81.3	5.4	7.3	5.8

visits to the clinic. In the acute cases they are given drops of glycerine plus 1 per cent. carbolic acid to use at home. The mother is shown how to put the child lying flat and to pour a teaspoonful of the medicine into the ear and allow it to soak in for 15 minutes by the clock, three or four times daily.

The clinic is carefully organized. It was once pointed out to the writer by Dr. Chaikin that to ensure success in the treatment of children it was necessary to enlist the help of the mother. We do so by not wasting her time. To each patient is given or sent an appointment for a definite time on a definite date written on a card. The time of the session is spaced off into intervals, and the appointments given according to the interval available and according to what interval suits the mother best. The children are called in the order in which their names are written in the book and not in the order in which they choose to arrive. The writer has thus a contented and orderly clinic working without friction.

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External otitis	20	17	2	1	—
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ACUTE SEPTIC PERITONITIS

should be realized that this procedure, beneficial though it be, is not likely to avert a fatal issue. Vomiting is likely to persist for many hours, and the acidosis and intestinal paresis cannot be expected to pass away in time to allow the retention of ingested liquids and food. In the case of adults, in whom we seldom see such a deplorable condition, the well-known "Murphy drip" is employed; but the young child, toxic, distressed and restless, will not tolerate a rectal catheter, nor will such a child retain a rectal saline. The "Murphy drip" in such cases only increases the distress. Therefore the writers have found it expedient to allow a cone of cæcum to project from the wound between the upper and lower drainage tubes. A through-and-through silkworm gut suture for the abdominal wall, introduced and tied on either side of the cæcal protrusion, will serve to retain the drainage tubes *in situ*, and close the abdominal cavity to the required extent. A rubber catheter of small calibre is fixed into the cæcum by the Witzel method of gastrostomy, but only three or four inches are utilized outside the gut, the rest of the catheter being cut off and discarded. A pint of saline, bicarbonate and glucose solution is introduced thus into the cæcum and ascending colon. The first half-pint is allowed to flow as rapidly as the catheter will permit, the second half-pint much more slowly. The cæcal catheter is then immediately closed by a fine and very light clip, so light that, as it lies upon the immediate wound dressings, it does not exercise traction on the tube and tend to pull it from the gut. The alkaline saline glucose solution is given subsequently in threequarter pints every two hours.

The result of supplying this fluid to the thirsty colon is nothing short of magical. Almost before one's eyes and within a few minutes of the injection the child may be seen to fall asleep, as if an opiate had been

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the first step, and should never be attempted under a general anæsthetic. The difficulties of operation by local novocaine anæsthesia are great in the toxic, restless child. These must be overcome, however, and should not deter the operator. Several assisting nurses are necessary to steady the limbs, head and body of the child, and arrest what attention it will give. The anæsthesia should be as perfect as possible and carefully carried out, and it will thus be found easy to painlessly enter the abdomen and allow the first gush of pus to escape. The surgeon's forefinger should then be passed into the pelvis and across it to the left paracolic gutter. All collections of pus are connected by the rapid breaking down of recent lymph adhesions. The exudate thus gravitates into the pelvic cavity and overflows at the wound. The surgeon's finger is reintroduced along the right paracolic gutter, and this is usually followed by another gush of pus towards the wound. It is wise also to pass the finger medially between the parietal peritoneum of the anterior abdominal wall and the adherent omentum and coils of intestine, thus a shallow pool of pus may not be overlooked. It is during this stage—the rapid breaking down of plastic adhesions and the removal of the gangrenous viscera—that pain may be experienced by the patient. Accordingly, just before this short procedure is begun, it is advisable to give a small quantity of ether on a face mask. This dulls the sensibility of the child, and allows the painful manipulations to be performed rapidly. Upon no account should much ether be given.

The pus is foetid and in large quantity, and drainage by tube is indicated. It is well to pass one tube into the right kidney pouch which, at the moment, is an abscess cavity, and bring it out at the upper angle of the wound. A second tube is passed into the pelvis and projects from the lower end of the incision. It-

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given. The following injections, at two-hourly intervals, are similarly followed by peaceful sleep. The vomiting rapidly disappears, and the transformation in the appearance of the child is wonderful. The pulse improves rapidly, and the child is soon on the high road to recovery. The rapid absorption of fluid from the colon in such a case is well shown by the fact that even after several pints have been administered no action of the bowels per rectum has followed. The abdominal walls relax and the rigidity and tenderness rapidly disappear.

There are certain objections to the employment of the other methods for the introduction of saline and alkaline fluids, namely, intravenous and subcutaneous. In the child the intravenous route is difficult and repetition of the process still more so. It is a forced introduction of much fluid into the circulatory apparatus, the central organ of which is enfeebled by pronounced toxæmia. It is not devoid of danger. Slow physiological absorption from the thirsty mucosa of the colon is an infinitely better, safer and less disturbing process. Subcutaneous transfusion is much too slow, for in the toxic child absorption would be so delayed as to be practically useless, and any useful quantity of fluid transfused in so small a patient would aggravate the distress and increase shock.

So far as we (the writers) are aware, the use of a catheter for this purpose is not practised, and it is because of clinical experience in such cases that we would specially recommend its use where the "Murphy drip" is so impracticable as to be useless. We have had but a limited experience of the use of anti-gas-gangrene serum; but in a recent desperate case (a child aged four years) in which we used the cæcal catheter, we gave a 40 c.cm. dose by injection into the pectoral muscles before the patient left the operation and she made a good recovery.

The Treatment by Stock Vaccines of Uterine Infection in the Puerperium.

By PATRICK MOLONEY, L.R.C.P., L.R.C.S.
Arklow; late of Postmasburg, Cape Province.

MY reason in bringing forward the above treatment is chiefly for the benefit of general practitioners in country practice. In doing so I have to controvert the views of a well-known gynaecologist who some years ago asserted that a rise of 1° Fahr. is of no importance immediately or twenty-four or forty-eight hours after delivery. To my mind this slight rise of temperature is very often the fore-runner of uterine infection after delivery, and to ensure the best results must be treated energetically. With the rise in the temperature there is diminution of and finally total suppression of the lochial flow; the same is true of the secretion of the milk, so that many mothers who would gladly suckle the newly-born child are obliged to give various kinds of infant foods or cows' milk. Moreover, in addition to the above, there is a hindrance to the normal subinvolution of the uterus and vicarious menstruation. It appears to me if there is anormal subinvolution of the uterus there will be a normal secretion of milk and greater satisfaction to the mother and child. Again, a normally subinvolved uterus will cause in future years less strain to the uterine supports than a large and heavy one. My attention was first drawn to these matters some seventeen years ago by the following case:

A patient, a multipara, married for twenty-five years, informed me that: "Her milk always went away after her confinements,

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given. The following injections, at two-hourly intervals, are similarly followed by peaceful sleep. The vomiting rapidly disappears, and the transformation in the appearance of the child is wonderful. The pulse improves rapidly, and the child is soon on the high road to recovery. The rapid absorption of fluid from the colon in such a case is well shown by the fact that even after several pints have been administered no action of the bowels per rectum has followed. The abdominal walls relax and the rigidity and tenderness rapidly disappear.

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Practical Notes.

Spinal Anæsthesia in Obstetrics.

S. A. Cosgrove believes that the employment of spinal anaesthesia in obstetrics in selected cases is directly conservative of both maternal and foetal life. The single contra-indication to its employment is hypotension; the safe systolic minimum is placed by Dr. Cosgrove at 110 mm. Hg. Novocaine is the anaesthetic agent employed, 50 mg. being given for vaginal and perineal operations, and 75 mg. for laparotomies; this is about half the average dose used by various authorities, but the anaesthesia was perfect. Small calibre needles are used, and the injection is made as slowly as possible, into the spinal canal at the level of the fourth lumbar interspace. Spinal anaesthesia is not suited to first-stage anaesthesia by reason of its short duration. At the termination of the second stage by the vaginal route, it causes entire soft-tissue relaxation; in selected cases this property may obviate lacerations or the necessity for episiotomy; it may be used here for any condition contra-indicating general anaesthesia, but it is not suggested for routine use.—(*American Journal of Obstetrics and Gynecology*, December, 1927, p. 751.)

Disorders of the Climacteric and their Treatment.

J. Halban, in dealing with many of the common conditions associated with the climacteric period, points out that a large number of these are due to the influence exerted by the ovary on the whole of the vegetative nervous system, including the sympathetic. In general the result of ovarian deficiency will depend on whether the patient is sympathetico- or vago-tonic, but in the same patient one organ may be more under the influence of the sympathetic system, another under that of the para-sympathetic, so that the most varied combination of symptoms may be found. Irritation of the vasomotor centres, resulting in sudden dilatation or contraction of peripheral blood vessels, gives rise either to "hot flushes" or to feelings of numbness and tingling in the extremities. Halban has found a combination of theobromine with calcium lactate and nitroglycerine very successful in controlling these symptoms. This treatment should not be continued for more than eight to ten days at a time. A 1 per cent. solution of nitroglycerine given in two to three drop doses in water is of value in relieving the distressing attacks of pseudo-angina, cardiac pain and palpitation from which so many patients suffer at this time. By upsetting the endocrine balance, ovarian deficiency renders these patients particularly liable to myxoedema, so small doses of thyroid extract should be given for alternate months during the climacteric period. Ovarian extracts have proved disappointing, though a good brand may be tried.—(*Wiener Medizinische Wochenschrift*, January 5, 1928, p. 10.)

The Intra-Pleural Injection of Iodoform.

D. Kirschenblatt and B. Nasarjan describe the treatment of over thirty cases of different types of pleural effusion by intra-

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and though desirous of suckling her child, she was never able to do so. After her confinement a lump appeared in her stomach which constantly moved like the waves of the sea. This continued until she again became pregnant."

The confinement to which I was accidentally called in during the absence of her usual medical attendant was normal, the placenta was expelled by pressure. On the second day there was a diminution of the lochial flow, and a rise in the temperature of one degree Fahr. I gave her an injection of five millions of polyvalent antistreptococcus vaccine, with the result the temperature fell to normal next day and the lochial flow was increased. Later on, the temperature again rose and the secretion of milk began to diminish, and a second injection of five millions of antistreptococcus polyvalent vaccine was given. The temperature became normal, also the lochial flow, and secretion of milk also was normal. The patient returned to her home, had an abundant secretion of milk, no vicarious menstruation, and suckled the child up to the age of twelve months. The result of the treatment shows how satisfactory it was.

Many similar cases have been treated in this fashion with invariable success, provided treatment was begun as soon as the first symptom of infection was perceived.

Another case was one of puerperal septicæmia, followed by an empyæma in the right pleural cavity with quite a pint of pus. This case was also a multipara, coloured; she had been given up as a hopeless case by the district surgeon, who had attended the confinement. When I was called in she had a temperature of 106° Fahr., with tenderness and pain in the abdomen, and was too ill to be examined. She was given daily doses at first of five millions of the antistreptococcal polyvalent vaccine. No reduction of temperature being observed it was pushed up twenty-five millions. The abdominal symptoms ceased, but the temperature remained at 106° Fahr., and the patient complained of pain in the right side. The secretion of milk was normal, and the baby was suckled without any apparent ill-effects. A puncture by a hypodermic needle showed milky white pneumococcal pus; the treatment was then changed to pneumococcal vaccine daily injected. The temperature did not fall to normal until 500 millions of this vaccine had been injected in one dose. There was no surgical interference in this case, and no further treatment. When the patient was seen four months afterwards, both herself and the baby were in perfect health and she had an abundant supply of milk, and she remarked that one day she coughed up a teaspoonful of pus; this was the last of the empyæma.

I wish to point out the efficacy of this treatment of uterine infections by small doses of antistreptococcal vaccine, and also, when the pneumococcal infection shows itself by its metastatic behaviour, the efficacy of the pneumococcal stock vaccine.

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S. A. Cosgrove believes that the employment of spinal anaesthesia in obstetrics in selected cases is directly conservative of both maternal and foetal life. The single contra-indication to its employment is hypotension; the safe systolic minimum is placed by Dr. Cosgrove at 110 mm. Hg. Novocaine is the anaesthetic agent employed, 50 mg. being given for vaginal and perineal operations, and 75 mg. for laparotomies; this is about half the average dose used by various authorities, but the anaesthesia was perfect. Small calibre needles are used, and the injection is made as slowly as possible, into the spinal canal at the level of the fourth lumbar interspace. Spinal anaesthesia is not suited to first-stage anaesthesia by reason of its short duration. At the termination of the second stage by the vaginal route, it causes entire soft-tissue relaxation; in selected cases this property may obviate lacerations or the necessity for episiotomy; it may be used here for any condition contra-indicating general anaesthesia, but it is not suggested for routine use.—(*American Journal of Obstetrics and Gynecology*, December, 1927, p. 751.)

Disorders of the Climacteric and their Treatment.

J. Halban, in dealing with many of the common conditions associated with the climacteric period, points out that a large number of these are due to the influence exerted by the ovary on the whole of the vegetative nervous system, including the sympathetic. In general the result of ovarian deficiency will depend on whether the patient is sympathetico- or vago-tonic, but in the same patient one organ may be more under the influence of the sympathetic system, another under that of the para-sympathetic, so that the most varied combination of symptoms may be found. Irritation of the vasomotor centres, resulting in sudden dilatation or contraction of peripheral blood vessels, gives rise either to "hot flushes" or to feelings of numbness and tingling in the extremities. Halban has found a combination of theobromine with calcium lactate and nitroglycerine very successful in controlling these symptoms. This treatment should not be continued for more than eight to ten days at a time. A 1 per cent. solution of nitroglycerine given in two to three drop doses in water is of value in relieving the distressing attacks of pseudo-angina, cardiac pain and palpitation from which so many patients suffer at this time. By upsetting the endocrine balance, ovarian deficiency renders these patients particularly liable to myxoedema, so small doses of thyroid extract should be given for alternate months during the climacteric period. Ovarian extracts have proved disappointing, though a good brand may be tried.—(*Wiener Medizinische Wochenschrift*, January 5, 1928, p. 10.)

The Intra-Pleural Injection of Iodoform.

D. Kirschenblatt and B. Nasarjan describe the treatment of over thirty cases of different types of pleural effusion by intra-

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pleural injection of iodoform. This was introduced into the pleural cavity as an emulsion, suspended in glycerine, olive oil and ether (1 : 9), preferably in one, or at most two doses of one to two ccm. In nearly all cases a sharp febrile reaction lasting from two to four days followed immediately, and subsequently reabsorption of the fluid took place. Empyemata as well as sero-fibrinous, tubercular and hemorrhagic exudates (from a new growth of lung), were included in the cases treated in this way, and it was found that whilst in no case did a serious effusion become purulent, the thicker effusions tended always to become clearer. The authors suggest that in empyema early treatment by this method would frequently render resection of a rib and open operation unnecessary.—(*Münchener Medizinische Wochenschrift*, December 30, 1927, p. 2213.)

The Sugar Treatment of Nephritis in Children.

W. Hirschfeld brings forward evidence of the value of sugar in the treatment of severe nephritis in children by reference to twenty-four cases. In 8 cases with fully-developed uræmia he did not rely on the sugar diet alone, but had recourse to blood-letting, lumbar puncture and chloral hydrate narcosis as well. None of these cases died. In 8 cases with prodromal symptoms of uræmia, headache, nausea and increased tendon jerks, the sugar diet was the only treatment given. Of these cases 3 were completely relieved of symptoms and their general condition much improved, 3 were undoubtedly benefited, while in 1 case the treatment had no effect, the child dying two months later. The amount of sugar given and the time for which it was given depended on the weight of the child and the state of general nutrition. Nothing else except the solution of sugar in water was allowed to be taken during the treatment, so loss in weight was inevitable. Treatment was usually given for two days at a time. In cases without uræmic symptoms, administration of sugar produced an increased diuresis and consequent diminution of the oedema. Hirschfeld ascribes this to the salt-free nature of the sugar solution, as the same result can be obtained by the use of any salt-free diet.—(*Archiv für Kinderheilkunde*, November 11, 1927, p. 245.)

The Colloidal Lead Treatment of Malignant Growths.

W. S. Stone and L. F. Craver have carried out a study of the colloidal lead treatment of malignant growths, 21 patients having been treated during eleven months for the following lesions: carcinoma of the breast, 7; malignant bone tumours, 5; carcinoma of the uterus, 3; carcinoma of the rectum, 1; angiosarcoma of the mouth, 1; malignant retroperitoneal tumour (pancreas), 1; metastases of a malignant tumour (? testicle), 1. All cases favourable for cure by surgery were excluded, and in all of the cases treated the disease was well advanced; but no cases were treated which were apparently in the terminal weeks of the disease, or in which the general condition was such that the introduction of a poisonous agent would apparently be hazardous. The authors conclude that

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it does not appear to them that the intravenous injection of lead offers a cure for malignant growths. Their experience suggests that in cancer of the breast, especially in the bone metastases from this tumour, the lead alone can produce favourable changes, and if used in connection with radium or X-rays, can cause retrogression sufficiently complete in advanced cases to make greater palliation in radio-resistant tumours than has hitherto been accomplished. In malignant osteogenic sarcoma, the authors' experience strongly suggests that lead in conjunction with radiation offers a valuable method of treating such tumours. The authors' results have been produced with smaller amounts of lead than Dr. Blair Bell advises, and apparently less constitutional damage has been caused; they do not advise a single dose of over 90 milligrams of colloidal lead in any case, and are inclined to think that 75 milligrams would be a safer amount and would produce the same clinical effects upon the tumours.—(*Annals of Surgery*, September, 1927, p. 347.)

Drainage of the Bile Ducts without Duodenal Tube.

A. Bernard gives details of eight cases illustrating a new method of bringing about medical drainage of the bile ducts without the necessity of employing the duodenal tube. He gives the cholagogue substances in the form of an effervescent mixture—bicarbonate of soda and tartaric acid—which bursts the capsule enveloping them, and are dissolved in the gastric secretions and in an infusion taken along with this capsule. The cholagogue substances thus enter the duodenum in solution and bring about a reflex discharge of bile from the gall-bladder.—(*Paris Médical*, October 8, 1927, p. 276.)

The Treatment of the Fever in Tuberculosis.

M. Pruvost observes that although the fever in tuberculosis is best combated by rest in bed, fresh air and a suitable dietary, yet certain drugs have a beneficial effect upon it. He recommends the following prescription :

Rx	Pyramidon	-	-	-	g. 0·15 to 0·30 (grs. iiss to v)
	Cryogenine	-	-	-	g. 0·10 (grs. iss)
	Caffeine	-	-	-	g. 0·02 (gr. $\frac{1}{2}$)

for one cachet. Sig.: One to two cachets each day. Antipyrine is also of value, one to three cachets of 0·5 gram being given each day. Other physicians prefer acetanilide, 0·3 to 0·75 gram (grs. v to xij) being given in twenty-four hours, or phenacetin 0·15 to 0·5 gram (grs. iiss to viiss) in the same period. Quinine, however, given in small doses—0·2 gram (grs. iiij) in a day—has certain advantages over antipyrine, acetanilide, and phenacetin, for, although it does not lower the fever much in such small doses, it has a tonic effect upon the patient.—(*Journal des Praticiens*, January 14, 1928, p. 25.)

The Treatment of Obesity.

L. Bauman states that in certain obese individuals there is evidence pointing to a lowered specific dynamic action to protein. The

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pleural injection of iodoform. This was introduced into the pleural cavity as an emulsion, suspended in glycerine, olive oil and ether (1 : 9), preferably in one, or at most two doses of one to two ccm. In nearly all cases a sharp febrile reaction lasting from two to four days followed immediately, and subsequently reabsorption of the fluid took place. Empyemata as well as sero-fibrinous, tuberular and haemorrhagic exudates (from a new growth of lung), were included in the cases treated in this way, and it was found that whilst in no case did a serious effusion become purulent, the thicker effusions tended always to become clearer. The authors suggest that in empyema early treatment by this method would frequently render resection of a rib and open operation unnecessary.—(*Münchener Medizinische Wochenschrift*, December 30, 1927, p. 2213.)

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86½ per cent. solution of glucose with 0·8-1 c.cm. of a 1 per cent. solution of sublimate. The first injection is made as high up in the thigh as possible, preferably in the upper third; subsequent ones progressively lower down. The vein is punctured whilst the patient sits on the operating-table with the legs hanging, and the needle fastened in with a strip of plaster. The patient is then placed in the horizontal position, and the veins are emptied by raising the legs as high as possible. An assistant compresses the vein digitally 10 c.m. above and below the site of injection, whilst 5 cc. of glucose solution are injected slowly into the vein. Pressure is maintained for two to four minutes after the action of the solution. A small compression bandage concludes the operation, which is practically painless. Any great pain should arouse suspicion that the injection has been made outside the vein. Patients are allowed to go home immediately, but are advised to take things easily for a day or two. Further injections may be made at intervals of three to four days; Dr. Saloman has not yet injected more than one part of a vein at one operation. The method has given good subjective and objective results in well over 50 per cent. of the patients treated. It is contraindicated in severe general diseases such as the severe anaemias, diabetes, heart and kidney disease, as well as in acute or subacute inflammatory conditions of the veins.—(*Deutsche Medizinische Wochenschrift*, January 6, 1928, p. 14.)

The Etiology of Measles.

C. W. Duval asserts that as a result of experimentation it has been definitely established that the blood and naso-pharyngeal secretion of human cases of measles contain the specific excitant. The reaction in the experimental animal is characterized by a complex of objective and subjective signs which closely resemble measles in man. A filterable form of a living micro-organism (Tunnicliffe's coccus) occurs regularly in the circulating blood of measles, and is cultivatable as a non-filterable coccus. While this coccus gives rise to significant reactions in the experimental animal and the human skin of those susceptible to measles, it remains yet to establish its etiological rôle in measles.—(*New Orleans Medical and Surgical Journal*, January, 1928, p. 423.)

The Treatment of Cancer of the Breast.

M. Proust reports a case of cancer of the breast in a woman, aged 49, which was considered to be inoperable. Radiotherapy was tried, however, and the condition of the breast improved so much that an operation was performed, and the patient has remained cured three years later. The case is interesting as showing inoperable cancer becoming operable after radiotherapy.—(*Gazette des Hôpitaux*, February 11, 1928, p. 215.)

The Treatment of Laryngeal Tuberculosis with Mercurochrome.

H. F. Gammons notes that one of the most troublesome com-

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work of Grafe and various other workers point to a compensatory rise in the basal metabolism during periods of over-feeding. The majority of the patients studied were women, and while constitutional factors were present in some, lack of balance between ingestion of food and expenditure of energy was the prevailing cause of fat storage. With regard to the prevention of obesity, mothers should be informed that over-eating is a habit which may be acquired during childhood, often through the efforts of over-indulgent parents. The treatment recommended by Dr. Bauman consists of a low caloric diet, exercise, and in selected cases thyroxin. The daily food allowance contains approximately 100 grams of carbohydrate, 70 of protein and 60 of fat. In hypertension the protein intake is lowered and salt also is restricted; in patients with cardiac embarrassment the water and salt intake is reduced. The exercise advised is daily walking of two miles in forty-five minutes or less, or calisthenics lasting ten minutes morning and evening. Thyroxin in a dose of 0.0008 gram daily is administered to selected patients.—(*Journal of the American Medical Association*, January 7, 1928, p. 22.)

Fattening in Tuberculosis by the Use of Insulin.

J. Morin and F. Bouessée have treated eight patients suffering from tuberculosis by injections of insulin, which has definitely increased weight apparently by stimulating the appetite. The injections were given hypodermically half an hour before meals, increasing from one injection of 5 units on the first two days, to two injections of 5 units on the next two days, and then increasing the dose by 5 units every two days until 15 units are given at each of two injections, treatment being continued for a month.—(*Annales de Médecine*, October, 1927, p. 308.)

The Treatment of Gastric Ulcer.

G. Faroy insists that in the treatment of gastric ulcer the patient must be kept strictly to the following regime for a long time—five or six months. Absolute rest is most important, if it is possible for the patient to have it, and the dietary should be milk and farinaceous foods. Bismuth should be given regularly for several months, and atropine (1 to 1.5 milligram) given by hypodermic injection morning and evening for a week, followed by a remission of three or four days, then repeating the injections, and so on. Bicarbonate of soda and other alkalines are administered only as sedatives when there is pain. Under this treatment, Dr. Faroy states, improvement is rapid, being apparent by the tenth day; the patient is examined by the X-rays from time to time, the X-ray appearances being the criterion of improvement.—(*Le Progrès Médical*, February 4, 1928, p. 191.)

The Injection of Varicose Veins.

A. Saloman describes his technique and discusses the place of the injection method in the treatment of varicose veins. He uses a

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66½ per cent. solution of glucose with 0·6-1 c.cm. of a 1 per cent. solution of sublimate. The first injection is made as high up in the thigh as possible, preferably in the upper third; subsequent ones progressively lower down. The vein is punctured whilst the patient sits on the operating-table with the legs hanging, and the needle fastened in with a strip of plaster. The patient is then placed in the horizontal position, and the veins are emptied by raising the legs as high as possible. An assistant compresses the vein digitally 10 c.m. above and below the site of injection, whilst 5 cc. of glucose solution are injected slowly into the vein. Pressure is maintained for two to four minutes after the action of the solution. A small compression bandage concludes the operation, which is practically painless. Any great pain should arouse suspicion that the injection has been made outside the vein. Patients are allowed to go home immediately, but are advised to take things easily for a day or two. Further injections may be made at intervals of three to four days; Dr. Saloman has not yet injected more than one part of a vein at one operation. The method has given good subjective and objective results in well over 50 per cent. of the patients treated. It is contraindicated in severe general diseases such as the severe anemias, diabetes, heart and kidney disease, as well as in acute or subacute inflammatory conditions of the veins.—(*Deutsche Medizinische Wochenschrift*, January 6, 1928, p. 14.)

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plications of pulmonary tuberculosis, to the practitioner as well as to the patient, is a laryngeal infection. How much value must be attributed to local treatment is hard to determine in the individual case. The question of the general resistance must be considered; the most important treatment is complete vocal rest. For the last two years Dr. Gammions has been using a 20 per cent. solution of mercurochrome 220, with gratifying results. The patients are treated three times a week, the mercurochrome being applied within the larynx on a swab. No bad reaction has been observed. Treatment may be continued for some months.—(*Medical Journal and Record* [New York], February 1, 1928, p. 136.)

The Treatment of Cancer of the Throat.

N. S. Finzi, taking part in a discussion on deep X-ray and radium therapy, records his belief that in a few years laryngectomy and even thyrotomy for intrinsic laryngeal cancer will be a thing of the past. The functional results are on the whole much better with radium, and it seems as if the cures will be at least as large in proportion as by surgery. On the other hand, extrinsic laryngeal growths are much more resistant to radiation and much less accessible to radium treatment. Growths in the back of the tongue or epiglottis are often unfavourable to surgical measures, but when these are possible they should be used in preference to radiations. In growths of the front of the tongue, floor of the mouth, palate and tonsil, the local results obtained by radium needles have been so good for the last two years that there is a great increase in the use of radium in preference to the former treatment of the local disease with diathermy and the glands with either radium collar or X-rays. Where there is a choice of treatment, the examination of the microscopical section may decide the treatment. The epitheliomata are graded according to the amount of keratinization, grades I and possibly II being treated by radium, and grades III and IV by surgical measures.—(*Proceedings of the Royal Society of Medicine*, February, 1928, p. 656.)

The Treatment of Head Injuries.

A. M. Dickinson is of opinion that all head injuries should be treated conservatively. Operate only for depressed or compound fractures and in cases of middle meningeal haemorrhage; rarely is operation indicated for increased intracranial tension. Never operate upon a patient in shock or in the terminal stage of medullary oedema. Glucose solution intravenously and lumbar puncture are of great value in the treatment of most head injuries.—(*New York State Journal of Medicine*, February 1, 1928, p. 124.)

Reviews of Books.

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THIS has been compiled by a committee of the medical staff in conjunction with the pharmacist of the Queen's Hospital for Children, Hackney Road. It contains 42 pages of formulæ, arranged alphabetically, and there is a copious appendix of 36 pages, into which are gathered instructions to parents arranged under the following heads : Rickets, summer diarrhoea, hygiene, weaning, artificial feeding of infants, breast feeding, feeding of children aged one to five years, care of paralysed children, "running ears," teeth, after-treatment of children who have been operated upon for adenoids and enlarged tonsils, impetigo and ringworm. The usual information as to the preparation of enemas, poultices, etc., and the tables of weights and measures are also included. It is a most useful adjunct to the table of the general practitioner.

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been neglected by the manufacturers of margarine, and the Lever Biological Laboratories have produced an edible, tasteless oil (Essogen—see preceding report), which is a highly potent concentrate of vitamins A and D, and is in other respects suitable for blending with margarine. With the addition of this substance, Viking margarine and the other vitamin margarines manufactured by the Planters Food Company are all the year round equal in nutritive value and in vitamin content to the best summer butter, which, it may be pointed out, is often ten to a hundred times more potent in vitamins than the corresponding winter butter. The flavour of these vitamin margarines is excellent.

KOTEX.

(London : Kotex, Limited, 23, Eagle Street, W.C.1.)

Every practitioner must often have been surprised at the discomfort which women in these comparatively enlightened days have been content to endure at their menstrual periods, because of the traditional habit of using so-called sanitary towels of a type which must date back almost to medieval times. A new type, however, has recently been introduced, named Kotex, made of cellucotton absorbent wadding, impregnated with an odourless and non-irritating disinfectant, in a gauze container. Cellucotton absorbent wadding takes up sixteen times its own weight in moisture, five times more than the ordinary cotton of commerce, and therefore easily absorbs the menstrual discharges and does not merely hold them back. Kotex towels are of a uniform size, weight, and absorptive power, so that a woman can know at once of any changes that occur in her periods. Kotex, in our opinion, appears to be a preparation of real hygienic value, for the introduction of which every woman should be grateful.

CHOLUMBRIN CAPSULES.

(Nottingham : Messrs. Boots Pure Drug Co., Ltd.)

The value of cholecystography in the diagnosis of gall-bladder disease is now accepted, and it has been shown that the dye (sodium tetra-iodo-phenolphthalein) is quite as effective when taken in capsule form by the mouth as when injected intravenously—some authorities, in fact, are of opinion that it is more effective by the mouth as well as less toxic—provided that it is liberated in the right part of the gastro-intestinal tract. Messrs. Boots have therefore introduced, under the name of Cholumbrin capsules, a pure form of sodium tetra-iodo-phenolphthalein (0·5 gram) in stearic acid-coated capsules, for use in this method of radiological examination of the gall-bladder, and by employing them a high percentage of positive results can be obtained.

IODASEPTINE.

(London : Anglo-French Drug Co., Ltd., 238a, Gray's Inn Road W.C.1.)

Iodaseptine is a combination of iodine with formaldehyde and the phenyl radicle from benzo-methylic ether. It is non-toxic, producing

Preparations, Inventions, Etc.

ESSOGEN.

(Port Sunlight, Cheshire : Messrs. Lever Brothers, Limited.)

Only recently has it been recognized that the unpleasant taste of natural oils rich in vitamins, such as cod-liver oil, had nothing to do with the vitamins, which, in fact, have been found to be associated with the small proportion of unsaponifiable non-fatty matter normally present in the oil. As a result of research, therefore, the Lever Biological Laboratories have prepared an edible oil, named Essogen, which is tasteless and stable, and is a very concentrated preparation of vitamins A and D, being standardized both biologically and chemically. Essogen can be employed in all conditions where cod-liver oil would be beneficial, as it has more than all its advantages (for example, its potency is standardized and is not variable, as is the potency of cod-liver oil) and none of its disadvantages. As vitamin A has a tonic effect on the mucous membrane, Essogen is valuable in warding off colds and other infectious diseases. It may be administered as oil in doses of from one-half up to one teaspoonful twice daily, or in capsules, one capsule per day being an adequate dose.

VITAMIN MARGARINES.

(Bromboro' Port, Cheshire : Messrs. Planters Food, Limited.)

One of the first and most important revelations that were made when vitamins were discovered was that, while butter contained certain of these very necessary accessory factors, they were absent from margarine. There is but little, if any, difference in the fat and protein content of margarine and butter, and the caloric equivalent of the two is practically equal; but butter—that is to say, butter manufactured from the milk of suitably pasture-fed cows—is rich in the growth-promoting and antirachitic vitamins (vitamins A and D), while ordinary margarine, manufactured from vegetable oils, contains none. This knowledge has caused considerable disquietude to those interested in the health and feeding of the population of this country, for of recent years the consumption of margarine, with its increasing refinements in quality and flavour, has made very rapid progress, so that for a great mass of the population margarine has come to represent the chief supply of fat in the daily dietary. Even in such a great butter-producing country as Denmark it has been calculated that 45 lbs. of margarine are consumed per head of its population per annum. The problem of improving the food value of margarine by the inclusion of substances rich in vitamins without impairing its flavour has thus become in reality a national one. Naturally, this problem has not

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neither local nor general reactions, and is valuable in allowing of intensive iodine treatment by intravenous or intramuscular injection without any fear of producing iodism. Tablets are also available for oral administration. It has been used successfully in the treatment of chronic rheumatism, bacillosis, tropical diseases, etc.

SEPTICEMINE.

(London : Anglo-French Drug Co., Ltd., 238a, Gray's Inn Road, W.C.1.)

Septicemine resembles iodaseptine in being a combination of iodine and formaldehyde, but differs from it in containing a smaller proportion of iodine and a larger proportion of formaldehyde. It is employed intravenously and produces no local or general reaction, having a rapid defervescent action which makes it of decided value in infectious and septicæmic conditions. Clinical reports are to hand testifying to its success as an adjuvant in the treatment of meningitis, peritonitis, acute bronchitis, septicæmia, etc.

NEW PROMONTA.

(London : New Promonta Company, Ltd., Westmorland House, 127-131, Regent Street, W.I.)

New Promonta is an organic food preparation—available in the form of powder or tablets—of brain and spinal marrow tissue, containing the lipoids of the nerve tissue combined with the carriers of the known vitamins, calcium-glycerophosphate, iron albumen, and haemoglobin. Experiments have shown that animals fed with this preparation developed decidedly better than those not so fed, and clinical reports testify to its value in convalescence and in neurasthenia, insomnia, conditions of exhaustion and fatigue, malnutrition, anaemia, etc.

TRICALCINE.

(London Agents : Messrs. Wilcox, Jozeau & Co., 15, Great St. Andrew Street, W.C.2.)

Tricalcine is a preparation of calcium salts, manufactured in France under the direction of Dr. E. Perraudin, which, taken in conjunction with a suitable dietary, is calculated to aid and increase the assimilation of calcium by the body. Tricalcine is also sold mixed with certain other substances, such preparations including "Adrenalinated Tricalcine," "Fluorated Tricalcine," "Methyl-arsenated Tricalcine," and "Organotherapy Tricalcine."

RADIOSTOLEUM CAPSULES.

(London : The British Drug Houses, Ltd., 16-30, Graham Street, N.1.)

Radiostoleum is a standardized mixture of a solution of radiostol (a report of which recently appeared in our pages, and is a preparation containing a high percentage of vitamin D), in conjunction with a concentrate of vitamin A in a tasteless vegetable oil. It is valuable in all conditions where cod-liver oil might be indicated.

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1928

Where Law and Medicine Meet.

By SIR JOHN COLLIE, M.D., C.M.G., J.P.

Medical Examiner to the London County Council, Metropolitan Water Board, and the Shipping Federation, etc.

MANY people dislike returning to work after a holiday. When a working man has been absent from work—from whatever cause, be it sickness or accident—the disinclination to return to work increases every week he is away, and there is a very definite relation between the length of absence from work and the willingness to resume. Many men who are really physically fit for work, merely require that initial push towards usefulness which so many people of all classes require who have been long off work. Some are irresolute, and put off starting work because they feel that they are likely to suffer some inconvenience at first, an inconvenience which reasonable people put up with, for it lasts only a few days. They are not suffering from any incapacity for work, as the result of a former injury, but their feeling of inability to work is caused by nervousness, which all

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men who have had an accident have to overcome. Often they brood over the effects of their accident, and the payment of compensation and club sick-pay help to take away the necessary stimulus to work. The postponement of a return to work only leads to further and further postponements.

This is very extraordinary, and has been a source of wonder to me for a quarter of a century, for half-wages often means semi-starvation, or, at any rate, inefficient nutrition of both themselves and their dependents. If absence from work lasts many weeks, the workman may have to borrow money or sell or pawn his furniture. Malnutrition has a bad moral as well as a bad physical effect. I am not now referring to the time necessarily required to recover from genuine disabilities, but solely to the unnecessary time wasted in not returning to work when the attempt should be made. When a working man is compulsorily laid aside as the result of an accident, which, perhaps, he feels very strongly should have been avoided, a feeling of resentment often takes possession of him, and his subjective sensations are exaggerated rather than fought against. Everything in these cases depends upon the mental attitude of his medical practitioner.

The sole capital of the labouring classes is their labour, and if they can be reasonably encouraged to take an optimistic view of their case and of the future, many cases would end in a fair settlement and in the absence of County Court proceedings. I know this, for in my duty as medical examiner for the London County Council, Metropolitan Water Board and various insurance companies, I see a large number of accidents, and have abundant opportunities of understanding the mental outlook of the working classes. The art in these cases is to impress the injured man with the fact that he will be fairly treated, and to encourage his belief that his medical attendant, or the medical

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examiner for the corporation or company to whom he has been referred for an opinion, will, by the advice he gives the employer, do what he can to obtain justice. This inspires confidence, and if it is judiciously done it helps the injured man to turn a deaf ear to his abnormal sensations.

Mental and physical re-education is the be-all of cure in many of these cases. There is nothing I find so useful as passive movements, remedial exercises and massage, but this must be done by a private masseuse or remedial exerciser, who can afford to take half an hour each day to the individual attention of each case, and who takes a personal pride in restoring the injured limb. So-called massage, given in the mass, as it must be in large institutions, is of little use. The large numbers which have to be dealt with make individual attention, encouragement and personal interest almost impossible. Experience shows that it is best to employ and pay a private remedial exerciser. At any rate, I know that I have been able to restore to usefulness scores of persons by this method.

Counter-suggestion, if it is to succeed, must be applied individually. It should be begun early, and it should last for some time. Suggestion, persistently applied with authority, is wellnigh irresistible. One overpowering idea always excludes others. How often, for instance, do we find wisdom and reasonableness in engaged couples? Obsessions have nothing to do with reason or logic.

A lad lay for many weeks in a large metropolitan hospital, with both knees bent at right angles, and nothing would induce him to straighten them. As there was no apparent physical reason for this condition, he was given chloroform, when both knees relaxed, but immediately after his recovery from the chloroform they resumed their flexed position. A few days later, the patient occupying the bed on the lad's right hand, became wildly maniacal, and brandished a knife in a manner which terrified the lad. At the same time, the patient who was occupying the bed on the lad's left hand, was seized with an epileptic fit, to which he was subject. The lad jumped out of bed, and my friend, Mr. Somerville Hastings, who had been

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hastily summoned to the delirious patient, met the lad running for his life downstairs. He was made to live up to his new accomplishment, and was very soon discharged, cured.

We have a great responsibility in functional nerve diseases, and in functional conditions which complicate convalescence from an accident, and this is a great deal more than we, as a rule, realize. We can, by supineness, make chronic invalids, or we ^{may}, by throwing the weight of our personality into these cases, restore them to work, and teach the working classes that there is much more happiness in work than in idleness. Many working men have not yet learned that the only true happiness lies in work. It is wellnigh impossible in accident cases to instil a healthy mental attitude into a man after his case has been set down for arbitration at a county court. Indeed, as a rule, nothing can be done in this direction for a man who has consulted a solicitor.

Our conclusions are arrived at in two ways—either as the result of judgment or of sentiment, and, as Savage said, these run along parallel lines and never do, and never can, converge. There is a great temptation to be biased by sympathy when writing a report, but sentiment, although it has its proper place, is ill-matched in co-partnership with business. When a medical practitioner is asked: "Is the workman fit for duty?" he is at once placed in a judicial position, and it is clear that it is his duty to be fair to both sides, remembering that the master has his own way of dispensing charity, and that he has not commissioned the medical man whom he has asked to report on the case to dispense charity for him vicariously. The following case illustrates the difficulty which often arises when examining cases on behalf of an employer:

A.B., an employee in a public service, was reported to me as suffering from concussion of the brain, the result of an accident whilst on duty. He stepped on a mat which was on a polished floor, slipped and fell. He suffered from intense headache, photophobia, hemianopsia, and had been three months in bed. There was no evidence

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of a fracture, and there was a great temptation to take the line of least resistance, and say that his illness was the result of an accident, due to duty. Indeed, I was pressed by the practitioner in attendance to report to this effect. I formed the opinion that he had become unconscious whilst he happened to be standing on the mat, and that, on falling, the mat had slipped, and I reported the case as not due to duty. He eventually recovered and returned to work. Seven months later, he again had severe cerebral symptoms. This time, however, there was no accident alleged. The symptoms pointed to thrombosis of one of the vessels of the occipital lobe near the visual centre. He was ill for eight months, and eventually recovered. Some years after he was called up for service in the Great War, when he had two fits, became unconscious for ten days, and then died. The surgeon who attended him in France, knowing that I had seen him and was interested in his case, kindly wrote informing me that at the *post-mortem* no evidence of a fracture could be found, but that the dura mater was firmly adherent to the skull in the occipital region.

There is only one way of seeing things rightly, and that is, seeing the whole of them. It is an extremely difficult question in nearly all medico-legal cases to decide whether the symptoms complained of, are complicated by organic disease apart from the accident, or subjective mental sensations of a functional nature caused by a perverted mental outlook. For instance, pains in the back, without true rigidity, are in the vast majority of cases psychic and not due to physical causes.

A few osteophytic outgrowths in the spinal vertebræ are frequently found in apparently healthy labouring men who suffer from pyorrhœa, and it is a mistake to take them too seriously. Indeed, they may and often do exist in fairly marked numbers without disabling effects.

I was responsible, in this connection, for a man who had met with an accident, receiving compensation. I advised that compensation should be continued because it was found, upon X-ray examination, that four of his vertebræ were ankylosed as the result of excessive osteophytic outgrowths. He was, however, not so incapacitated as I thought, for, whilst in receipt of compensation, he was found one night on the roof of his late employer's warehouse stealing lead which he had stripped from it. When caught he was carrying the lead on his back—it weighed 49 lb. !

Experience is a good school, but the fees are

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high. Experience teaches a great deal in the conduct of the examination of workmen claiming damages. Verily the years teach us what the days never know. Plaintiffs often unconsciously assist the examiner to a material extent. Some are very alert, and not a few show considerable cunning. Where the road bends abruptly, it is well to take short steps. The following case illustrates that a plaintiff's conduct during his medical examination often materially assists in getting at the facts :

C.B., a stevedore, when about to be examined, refused even to try to undress, and his son, who accompanied him, did everything for him. He was, apparently, quite helpless. He complained, generally, of complete inability to move his right hip and left thumb. He implored me to end his sufferings by, as he put it, "putting a knife into him." He said he had been helpless for seven years, and that he often collapsed in the street. He had, he said, seen dozens of house surgeons at various hospitals. I thought there was nothing the matter with him, and had his right hip and left thumb X-rayed, with entirely negative results.

His employers had him watched, and a few weeks later, he was seen to bicycle rapidly to a public bath near his home, quickly and nimbly to remove his clothes, and to dive into the water and swim rapidly to the other side of the bath !

He had been drawing workmen's compensation for seven years I fear he was not grateful to me.

Viscero-ptosis and its Treatment.

By F. D. SANER, F.R.C.S.

Surgeon to the Royal Northern Hospital; Consulting Surgeon to Willesden General Hospital, etc.

THE term viscero-ptosis has been applied to a large number of cases who suffer from persistent gastro-intestinal symptoms not associated with a local organic lesion and in which radiograms depict an abnormally low position mainly of the stomach and colon. On the other hand a low position of these viscera may be seen on many occasions in individuals leading an active life and enjoying good health, and some doubt therefore as to the clinical significance of ptosis is constantly expressed. Gradually, however, it is becoming evident that an anatomical ptosis *per se* is probably unimportant; it may be normal for the individual inasmuch as it does not interfere with health nor create symptoms, but if it is associated with other deformities of the gut, namely elongation and abnormal mobility, it becomes at once an entity probably of pathological import, and constitutes the type known as congenital. Similar anatomical features may be produced in an otherwise normal individual by various incidental causes involving general exhaustion and abdominal strain, presenting the acquired type.

In every case that presents the clinical picture of ptosis these two factors—mobility and lengthening of the stomach or colon or both—are invariably present in addition to the ptosis, as has been insisted on by Waugh. These deformities by themselves create certain mechanical difficulties for the passage of the gastro-intestinal contents which are not the result of increased

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TREATMENT OF VISCEROPTOSIS

especially latterly, there has been a rather larger proportion of men.

Somewhat vague reasons for the increase may be sought for in a rapidly growing population, for many of whom there is a generally greater burden of every-day work and competition; and though these cases are met with in any station of life, the majority commence and continue existence in surroundings particularly unsuited to them. Such individuals are physically poorly equipped to withstand even the normal physiological stress of living, and if to this is added the strain of long hours, perhaps dull work, with unsuitable, irregular or insufficient food, the narrow margin between fit and unfit, health and ill-health, is sooner or later broken down.

In addition to the abdominal abnormalities already mentioned, which are due partly at any rate to a faulty or incomplete fusion of the mesenteries, there are definite mental and skeletal deficiencies the results of which are interdependent.

In the first place there is a depreciation of what is described as "postural tone," which in itself, if allowed to persist, prejudices a proper development of the skeleton. To correct a faulty posture requires mental effort and concentration in direct proportion to the age, and in these cases side by side with the lack of postural tone is a particular mentality that fails to combat it (Walton, Bankhart). It would seem then that the individual who is born with this particular abdominal deformity has also a certain central deficiency, and thus early in life a vicious circle is established which is exceedingly difficult to break. In some cases a "ptosis habitus" is assumed with the lower abdomen thrown forward, the lumbar arch straightened, and a slight general kyphosis (perhaps associated with scoliosis) of the thoracic and cervical spine develops with the head dropping forward (Coffey). This position interferes with a proper development of the thorax and

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angulation at certain fixed points in the tract, but of loss of purchase necessary to move material in segments definitely uphill that this deformity entails. The gut, so to speak, is under a severe handicap. Again, this may not assume importance provided the neuro-muscular mechanism of the gut is sufficiently active and strong to overcome the difficulties, but if, as the result of exhaustion from its own inherent or superimposed strain, there is a failure in the driving mechanism, these difficulties at once are greatly exaggerated. Exhaustion causes an altered tone, atony and irregularity and inequality of action, resulting in inertia and stagnation in some segments, spasm and hurrying in others, a process which may lead eventually to an altered absorption from them. Such a condition has far-reaching results, which Lane originally embraced under the one heading—intestinal stasis.

From this point of view, then, an individual with these deformities in the abdomen has a potential disability; and strain, whether physical, physiological or pathological, may upset the balance adversely. Clinically, cases suffering from ptosis in its widest sense fall into two groups—congenital and acquired; as already indicated in the congenital cases, there are inherent deficiencies in the abdomen, central nervous system and skeleton, while in acquired cases the failure is mainly abdominal in the first instance, the result usually of physical exhaustion.

CONGENITAL VISCERO-PTOSIS.

As a rule these cases are of poor physical development, narrow in build, generally colourless in appearance and outlook, tired physically and mentally, and offer an easy prey to their own symptoms. There is no doubt that this type is increasing in number, women (15–50) being the chief sufferers in the proportion of four to one according to most observers, though in my own cases,

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for the first time after a haematemesis, presumably the result of some minute lesion in the mucous membrane of the stomach which cannot be demonstrated at a laparotomy at a later date.

Toxic.—Symptoms such as fatigue, drowsiness, headaches, joint and muscle pains, etc., are generally present or supervene. Constipation may be admitted or denied; from the patient's point of view its existence is judged mainly by the necessity or otherwise of aperients to produce satisfactory daily action of the bowels. Inertia and consequent stagnation may occur in any segment of or throughout the whole colon, and can be estimated; on the other hand, there may be only local difficulties in defecation. The fact that many patients will say they feel better if the bowels do not act suggests some general stimulus from the loaded bowel of the inert type, normally created from the unloaded.

Nervous.—The majority of the congenital cases have symptoms broadly described as "nervous," inasmuch as they are erratic and irregular and not associated with any demonstrable lesion, and these symptoms may eventually dominate the clinical picture. It would seem that in some cases the inherent and allied deficiencies of the abdomen and central nervous system develop *pari passu*, in others one of them predominates, while if a toxic absorption is superimposed it is not difficult to imagine far-reaching results on an already unstable central nervous system.

Radiograms reveal a typical appearance. The stomach, considerably elongated, extends vertically down to the pelvis, perhaps to the brim or in the extreme case below it, while the pre-pyloric segment bends sharply upwards. The general shape of the stomach is well described as "fish-hook." There may be spasm but no organic deformity of the walls, while in some cases it empties rapidly; more often there is delay up

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diaphragm, and this in itself interferes with the abdominal viscera. In the less severe cases the narrow chest and upper abdomen, with a pelvis disproportionately broad, are typical features of the build of these patients (Walton). In this connection, too, it has been pointed out by Sherrington that postural tone is independent of the development of the skeletal muscles, and though these patients are as a rule of the narrow, frail, colourless type, in a few there is a good development of the muscles of the limbs, and not infrequently athletes of some distinction are seen because symptoms have developed, sometimes, one may say, much to their surprise.

Symptoms may be divided into abdominal, toxic and nervous, but are so well known as to require a brief reference only.

Abdominal.—Since the symptoms are mainly the result of spasm and distension in the stomach and gut during digestion, they may be expected to simulate those of the local organic lesions. This they do sometimes very closely, and to some extent, at any rate, the symptoms to which this condition may give rise came to be recognized through laparotomies for supposed ulcers of the stomach and duodenum and diseases of the gall-bladder, appendix, colon and right kidney when the gross lesion expected was not found (Walton). With a better appreciation of symptoms and X-ray findings, a differential diagnosis is now more easily made. On the whole an organic lesion causes a greater depreciation of health and gives rise to symptoms more severe, more regular and more localized than a "ptosis"; a typical case of the latter is characterized by erratic and irregular discomfort, persistent rather than severe, and, as a rule, relieved by lying down. A feeling of "drag" is often present in the abdomen, loins or back.

Not infrequently these cases come under observation

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a dull, bluish appearance, typical of an enfeebled circulation, which becomes more normal if the gut is massaged or stimulated by hot packs. Often, too, in spite of adequate pre-operative preparation, it contains much faecal material. The pelvic loop is elongated and distended.

The appendix is generally in much the same condition as the remainder of the large gut, distended with soft faecal material and inert. It may be free, attached to the ileal mesentery, or lying on the outerside of the cæcum; in this position it may be caught up in Jackson's membrane.

The right kidney is nearly always freely movable, and the pelvic viscera of the women are, as a rule, poorly developed, with varying degrees of tilting of the uterus.

Tissue formations in the nature of bands are found in the region of the terminal ileum (Lane's kink); between the gall-bladder and duodenum (ventral mesentery of the gall-bladder, Waugh); at the duodenal-jejunal flexure, the splenic flexure, and in nearly every case on the outer aspect of the pelvic meso-colon, in which not infrequently the left tube and ovary are involved (the first and last kink, Lane). In addition, Jackson's membrane, a thin veil of tissue stretched over the ascending colon and attached to the lateral abdominal wall, is found in many but by no means all cases. Controversy has continued over the meaning of these tissue formations since Lane first described them as part of the changes associated with intestinal stasis. It is impossible to dogmatize now as to whether they are congenital and part of the general deformity, or acquired; whether they have a direct bearing on the causation of a ptosis or stasis, or are the result of it; in the opinion of the majority they are of congenital origin, or at any rate formed early in life. The ileal and pelvic kinks are not altogether confined to cases

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to six, eight or even ten hours.

In the horizontal position the greater curvature of the stomach remains well below the umbilicus. There is no deformity of the duodenal cap, though it is on occasion poorly outlined.

The caput of the cæcum is situated about the level of the pelvic brim and varies little between the vertical and horizontal positions. The hepatic flexure is at the level of the crest of the ilium, and the proximal segment of the transverse colon may dip directly down into the pelvis or towards it, and then gradually rise, its distal segment almost vertically, to the splenic flexure. Apart from the low position the noticeable feature is the considerable lengthening of the transverse colon : the splenic flexure is at a much higher level than the hepatic. The pelvic loop of colon varies, but is also frequently considerably elongated. Delay occurs chiefly in the cæcum, ascending colon and the pelvic loop, while it may be marked throughout the whole colon. Residue is frequently seen in the appendix after the colon has emptied, thus giving rise to the frequent radiographic diagnosis of "chronic appendicitis."

The position of the gut as shown by radiograms is found to be confirmed at operation. The walls of the stomach are thin and paler than normal. The normal mobility of the duodenum is reproduced in its second and even its third part. The duodenal distension which may be marked has been attributed to mechanical obstruction from the structures passing in front of its third part, but is more likely due to exhaustion and atony.

Apart from its undue mobility and length the striking feature of the colon is its inert, flabby appearance. The cæcum and ascending colon can be freely delivered from the abdomen and sometimes can be carried well over to the left side; this segment has

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of ptosis.

Whatever their origin, there is no doubt in my own opinion that the ileal and pelvic kinks more especially are sufficient in certain cases to cause spasm and interfere with the passage of intestinal contents. In many cases the terminal ileum is anchored to the pelvic brim, sharply angulated and rotated on its axis by this band; and though this obstruction is not sufficient to cause hypertrophy of the gut behind it or to produce definite symptoms of colic, it creates a very definite deformity of the intestine. The kink on the outer aspect of the pelvic mesentery is present in most individuals, but in some it binds the centre of the pelvic loop firmly to the lateral abdominal wall, and the gut on each side of it shows a varying degree of distension. In the acquired type of ptosis these bands are not infrequently absent, a point in favour of their formation early in life in association with the other developmental abnormalities already mentioned. There are two factors which are common to all these cases—a general absence of intra-abdominal fat, and general loss of tone of the intestinal musculature—factors which must be constantly borne in mind during the consideration of treatment.

ACQUIRED VISCERO-PTOSIS.

The acquired cases of "ptosis" fall roughly into two groups—permanent and temporary. In the first group the main cause is pregnancy, or more often multiple pregnancies, with short intervals for recovery. In addition to the actual widening of the pelvis and stretching of muscles of the abdominal wall and pelvic floor, there is a fall of intra-abdominal pressure following delivery, factors which encourage a dropping of the viscera. In these cases there is, so to speak, a landslide of the stomach and intestines, and perhaps the solid viscera towards the pelvis. To some degree, at any

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rate, it is probable that a ptosis follows every pregnancy, but normally the individuals correct this afterwards, or accommodate themselves to it without any disturbance. In others, one or multiple pregnancies may cause exhaustion, which finds expression in the gastro-intestinal tract, perhaps, elsewhere; and then a condition has been created in a hitherto normal abdomen, as already has been described in the congenital type, but without the allied deficiencies. Succeeding pregnancies often afford temporary relief, due, in my opinion, not so much to the mechanical support of the gut by the enlarging uterus as to the rise of pressure in the abdomen and the general increased physiological activity. Similarly, a pregnancy may improve the general condition in a case with congenital ptosis, on occasion permanently, but, on the other hand, the symptoms may return with increased intensity after the pregnancy is over.

A sequel somewhat similar may follow an extensive operative procedure in the abdomen or repeated laparotomies.

The symptoms resemble those of the congenital type of viscero-ptosis; but while the X-ray and operative findings of the two types are also somewhat similar, there is not, in my experience, the same degree of mobility and lengthening of the stomach and colon, though there is a more total subsidence of the coils of small intestine into the pelvis.

The second (temporary) group may be brought about by such causes as a prolonged febrile illness, toxic absorption from some septic focus, or overwork, which may produce an exhaustion of the gastro-intestinal tract, with consequent dropping and stretching as a rule transient in nature. Also there are other causes more local in their effect. In my opinion an appendix, the site of persistent disease, may produce a localized exhaustion involving stretching, inertia and stasis in

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into operative and non-operative, whereas it is essential in these cases that any operation is to be regarded as a step only in a general scheme. At the same time the word "cure" scarcely describes the aim of treatment which is to retrieve a failure in an individual of poor tissue strength and to restore if possible a balance in his favour.

Broadly speaking, the aim of treatment is as follows :

(1) To revive the neuro-muscular mechanism of the gastro-intestinal tract, which perhaps as a preliminary will include a prolonged rest in bed while an attempt is made to restore or supply a sufficiency of intra-abdominal fat and to teach a certain discipline in diet and habits.

(2) To correct a faulty posture and improve the general physique, with special attention to the expansion of the thorax and upper abdomen by means of general remedial and respiratory exercises.

(3) If colonic stasis is marked, colon lavage should be employed.

In all cases when the diagnosis is clear, treatment on some such lines should be given a thorough and repeated trial. While, however, in many a temporary improvement will be gained and in some a more permanent relief, others, probably the majority, come to a standstill, and if the routine is relaxed at all tend to slip back.

The next step is to consider whether such cases can be benefited by operative measures, and from time to time various types of operation have been advocated. With the idea of reducing the mechanical difficulties, suspensory operations, chiefly of the stomach, transverse colon and right kidney, have been performed on many cases; while Waugh, who regarded the mobile cæcum and ascending colon and the consequent stagnation of their contents as the primary factor, advocated fixation of this segment of gut as a means of giving it greater purchase and better power of emptying. While in no way denying that cases have been benefited by

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the ileocaecal segment. Further, if the inflammation is prolonged the failure in the gastro-intestinal becomes more generalized, and from this point "appendicular dyspepsia" is due to some such seat. In a similar manner a cholecystitis or salpingitis may produce this effect on the gut in their neighbourhood.

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Congenital.—There are certain considerations borne in mind. Broadly speaking, viscero-psoriasis is not a fatal disease; the individuals may endure considerable discomfort, sufficient in most cases to prove a handicap, but they are able as a rule to carry on. Their expectation regarding length of life is not appreciably diminished, and they are not specially prone to the grosser diseases; in fact, in the abdomen they appear to possess a certain immunity. Again, it is the young and aged adults who are the main sufferers, and with the advance of old age the symptoms appear to ameliorate. It is rare for people in the seventh and eighth decades of life to complain of such symptoms, though they have been "martyrs to indigestion" always. Anatomical ptosis is present in a marked degree, and as a rule the conditions of life have become easer.

The mentality of these patients has to be reckoned with. Any treatment to be effective must necessarily be prolonged and tedious, and, moreover, must demand effort and concentration, qualities which are conspicuously lacking in this type of patient, who is apparently willing to undergo any treatment, but who wearsies of it when an immediate result is not obtained. Treatment therefore is difficult and sometimes discredited by a lack of definition on the part of the medical adviser and often of continuity on the part of the patient, and is on the whole disappointing.

As in general, treatment is apt to be sharp and

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tions have been practically abandoned, not because in the selected case they are theoretically unsound, but owing to the misery that may be produced by subsequent peritoneal adhesions and to the operative risk that is out of proportion to the condition. There is the occasional case, however, in which removal, more especially of the cæcum and ascending colon, may be justifiably considered.

Acquired.—The treatment of the acquired type differs inasmuch as one is dealing with a derangement in an otherwise normal abdomen and individual, and from this point of view better results may be expected. These cases in the main require support to the abdominal wall by a suitable belt, or to the pelvic girdle by means of a brace, combined with remedial exercises directed to the recovery of tone in the muscles of the abdominal wall and perineum. Displacement or de-nitity may have been produced in viscera such as the uterus or kidney, or in segments of the gut itself, which isolated can be corrected by operative means; but the more generalized ptosis, atony and stagnation, the arguments apply as have already been put for the congenital cases.

In other cases of acquired type where the effects are local and due to absorption from a septic focus difficulties are chiefly those of diagnosis, and treatment is straightforward.

It seems to have laid undue stress upon diet as an exciting factor in superimposing upon the presence of an existing ptosis and also as a causative factor in creating ptosis. But in view of the large number of patients whose symptoms are not alone, both physical and mental, in part played by exhaustion has this fact been so little emphasized by the medical profession. The consequence is not appreciated by those interested in industrial welfare.

such measures, surgical opinion in this country is on the whole against the suspensory operation in principle. There is the general objection that local procedures are either insufficient, inasmuch as they deal with a part only of what is a generalized condition, or excessive because fresh mechanical difficulties or post-operative effects may replace or be added to the old as the result of the operation itself. In a few carefully selected cases, however, such operations may be advisable, and more especially, in my opinion, when the "ptosis" is acquired; in the acquired type it is not uncommon for one segment of gut or a viscus to be particularly affected. In the congenital type, however, the actual ptosis of the viscera need not concern the surgeon, it being, so to speak, indigenous to the individual; but his attention should be confined to dealing with any structures, e.g. bands, that are creating additional deformities in the gut, and to the removal of any focus of septic absorption in the abdomen, or elsewhere.

If an ileal kink is angulating the intestine and rotating it on its own axis, it should be released, and the same applies to the pelvic kink. When the splenic flexure is situated at a considerably higher level than the hepatic, and the distal segment of colon ascends almost vertically to it, it is justifiable, in my opinion, to release the flexure. Such procedures increase the ptosis but remove certain difficulties that the gut has to overcome.

There are cases when the colon, more especially its right segment, is little more than an inert bag containing foul faecal material, and there is a choice of three methods of treatment—abdominal massage, continued lavage of the colon, or removal of the colon entire or in part. Arbuthnot Lane, who regarded intestinal stasis as the primary cause of this condition, and the colon as the main block in the drainage system, advocated ileo-sigmoidostomy or colectomy. Such opera-

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In the other cases of acquired type where the effects are mainly local and due to absorption from a septic focus the difficulties are chiefly those of diagnosis, while the treatment is straightforward.

I may seem to have laid undue stress upon exhaustion as an exciting factor in superimposing symptoms in the presence of an existing ptosis and also as an originating factor in creating ptosis. But in view of the large number of patients whose symptoms are relieved by rest alone, both physical and mental, in my opinion the part played by exhaustion has not been sufficiently emphasized by the medical profession, and in consequence is not appreciated by those responsible for industrial welfare.

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The Investigation and Treatment of Hæmorrhage Occurring About the Menopause.

BY DANIEL DOUGAL, M.C., M.D.

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HERE is no more important problem in the whole field of gynaecological practice than the correct interpretation of hæmorrhage occurring about the menopause. The chief difficulty lies in the fact that uterine hæmorrhage is the most obvious feature of the menstrual function, and therefore the distinction between physiological and pathological bleeding is apt to be somewhat fine. The work of Beckwith Whitehouse has done much to clarify our views as to the meaning of the menstrual function, and his investigations, as well as those of others, support the view that each menstrual period is in reality an afertile abortion and comparable to an abortion occurring during the early months of pregnancy.

Types of Uterine Hæmorrhage.—In investigating cases of pathological uterine hæmorrhage it is important to be quite clear as to the character of the bleeding and to employ a nomenclature which expresses this as accurately as possible. For instance :

(1) The menstrual periods are regular, but the amount of blood lost is excessive—menorrhagia (the profuse period).

(2) The menstrual periods are regular, but prolonged;

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there is no excessive blood loss—menostaxis (the lingering period).

(3) The periods are too frequent—epimenorrhœa. If, in addition, the amount lost is excessive the term epimenorrhagia may be applied.

(4) The bleeding is quite irregular, having no relation to the menstrual period—metrostaxis.

Although frequently associated with gross organic disease these four types may be found with apparently normal pelvic organs and Beckwith Whitehouse explains their occurrence in such cases as follows: Menorrhagia or severe menstrual haemorrhage is due to uterine insufficiency, and comparable to the inertic type of post-partum haemorrhage; it may be due to any general or local cause which interferes with the normal uterine contraction, and so leads to stagnation of the uterine circulation. Menostaxis or drawn-out periods he compares with incomplete uterine abortion, and he believes that it is probably the result of disordered action of the corpus luteum. Epimenorrhœa, or too frequent periods, is the clinical manifestation of a hyperactive state of the sex complex, ovulation occurring too frequently and the ova being poorly developed. Metrostaxis is frequently the reflexion of outside influences upon the uterus, i.e. functional hyperthyroidism, but may possibly be the result of pathological states of the ovarian follicles and corpora lutea. Metrostaxis is commonly found associated with hyperplasia of the endometrium, either diffuse or localized, but this hyperplasia again may be due to some underlying cause.

The Causes of Uterine Haemorrhage.—In a certain number of cases the uterine haemorrhage is due to lesions lying outside the genital apparatus, but I do not intend to refer to these in detail. Whilst it is important that such causes should be recognized it is of even greater moment to exclude with certainty the

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possibility of any local lesion, and this applies particularly to cases of bleeding about the menopause.

As regards haemorrhages produced by disturbances of the genital apparatus, the cases will fall naturally into two groups, those in which there are gross physical signs of disease, and those in which there are none. Amongst the latter will naturally be included true functional disturbances, as well as those pathological lesions which can only be discovered by careful exploration of the uterus or examination of the specimens after removal.

LESIONS WHICH PRODUCE GROSS PHYSICAL SIGNS.

(a) *Pregnancy*.—The possibility of some complication of pregnancy must be borne in mind even when dealing with patients about the age of the menopause. Irregular bright haemorrhage, the passage of clots and a preceding period of amenorrhœa will suggest a uterine abortion. In ectopic pregnancy there is usually a short period of amenorrhœa followed by abdominal pain which may or may not be severe, but is generally sufficient to make an impression on the patient. The external haemorrhage is always moderate in amount and the blood dark in colour, with an appearance which has been likened to walnut juice.

(b) *Inflammatory Lesions of the Uterus and Appendages*.—Recent infection of the uterus and Fallopian tubes is usually accompanied by menorrhagia as a result of pelvic congestion. In the chronic stages the periods may be too frequent and profuse from coincident fibrotic changes in the ovaries and uterus.

There is a well-defined barrier at the level of the internal os which usually prevents the upward spread of infection and so we find that many inflammatory lesions stop short at this point. Chronic inflammatory disease of the cervix may therefore be met with as a well-defined lesion and lead to uterine haemorrhage.

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The bleeding in such cases is usually irregular in occurrence, and may only be produced by trauma, i.e. coitus or digital examination. A similar condition is met with in severe cases of prolapse, particularly procidentias in which as a result of infection and friction the exposed cervix becomes inflamed and even ulcerated.

(c) *Benign New Growths*.—Fibroid and endometriomatous tumours are commonly met with as causes of haemorrhage about the menopause. It is quite wrong to suppose that if one only waits till the menopause in the case of a uterine fibroid, all symptoms will automatically cease. On the contrary the bleeding very often becomes more severe as a result of degenerative changes occurring in the tumour. Subserous fibroids do not usually produce haemorrhage unless they cause pelvic congestion from pressure. Intramural tumours are usually associated with menorrhagia, but as they approach the uterine cavity and become submucous the bleeding tends to become continuous or irregular. Uterine polypi, usually fibromyomatous or adenomatous, may arise either from the cervix or body of the uterus, and are frequently associated with irregular uterine haemorrhage.

Ovarian tumours, whether solid or cystic, do not usually produce uterine haemorrhage, and when they do it is generally the result of passive congestion from pressure on the pelvic veins. Follicular cysts of the ovaries are frequently associated with irregular bleeding, sometimes following a short period of amenorrhœa. When the affected ovary is readily palpable the case is sometimes diagnosed as one of ectopic pregnancy. The cause of the menstrual irregularity is doubtless interference with ovulation, and removal of the cystic ovary generally cures the condition.

(d) *Malignant New Growths*.—The importance of haemorrhage about the menopause, apart from possible

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possibility of any local lesion, and this applies particularly to cases of bleeding about the menopause.

As regards haemorrhages produced by disturbances of the genital apparatus, the cases will fall naturally into two groups, those in which there are gross physical signs of disease, and those in which there are none. Amongst the latter will naturally be included true functional disturbances, as well as those pathological lesions which can only be discovered by careful exploration of the uterus or examination of the specimens after removal.

LESIONS WHICH PRODUCE GROSS PHYSICAL SIGNS.

(a) *Pregnancy*.—The possibility of some complication of pregnancy must be borne in mind even when dealing with patients about the age of the menopause. Irregular bright haemorrhage, the passage of clots and a preceding period of amenorrhœa will suggest a uterine abortion. In ectopic pregnancy there is usually a short period of amenorrhœa followed by abdominal pain which may or may not be severe, but is generally sufficient to make an impression on the patient. The external haemorrhage is always moderate in amount and the blood dark in colour, with an appearance which has been likened to walnut juice.

(b) *Inflammatory Lesions of the Uterus and Appendages*.—Recent infection of the uterus and Fallopian tubes is usually accompanied by menorrhagia as a result of pelvic congestion. In the chronic stages the periods may be too frequent and profuse from coincident fibrotic changes in the ovaries and uterus.

There is a well-defined barrier at the level of the internal os which usually prevents the upward spread of infection and so we find that many inflammatory lesions stop short at this point. Chronic inflammatory disease of the cervix may therefore be met with as a well-defined lesion and lead to uterine haemorrhage.

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pain being most commonly complained of, but here again the growth is self-evident and diagnosis is easy.

Among the rarer uterine and vaginal tumours may be mentioned chorio-epithelioma, and examples of this interesting growth have been reported many years after a preceding pregnancy. Usually, however, the pregnancy is quite recent, and has frequently taken the form of a vesicular mole. Hæmorrhage is the most prominent symptom, but the final diagnosis will only be made after a careful histological examination.

LESIONS IN WHICH NO GROSS PHYSICAL SIGNS ARE PRESENT : FUNCTIONAL DISTURBANCES.

(a) *Infections and Allied Conditions.*—There is an important group of lesions generally included under the term chronic metritis which are commonly met with as a cause of hæmorrhage about the menopause. My colleague, Fletcher Shaw, has shown that the group includes three distinct pathological conditions, true chronic metritis, chronic subinvolution and hypertrophy. The first, chronic metritis, follows an infection, generally puerperal or gonorrhœal, and microscopic examination shows an increase in the connective tissue of the uterine wall at the expense of the muscle as a result of which the muscular control over uterine hæmorrhage is interfered with. The second variety—chronic subinvolution—is by far the most common, and is the lesion found in the vast majority of these cases. The chief histological feature here is the presence of masses of old elastic tissue lying around the vessels, and the bleeding in these cases is explained by supposing that these inert pads of elastic tissue prevent the uterine muscle from properly controlling the blood passing through the vessels. The third variety—hypertrophy—is rare, and is usually found in nulliparous women. All the constituents of the uterine wall are increased in amount including the

excessive loss of blood, lies in the fact that malignant tumours are prone to occur about this epoch, and it behoves us constantly to bear this possibility in mind. Cancer of the uterus is extremely common, being the cause of death, according to Roger Williams, of one woman in every thirty-five over the age of thirty-five years. Moreover, most authorities are agreed that it is the commonest malignant tumour found in women. The growth is met with most frequently in the cervix, and in that situation appears in two forms, the squamous carcinoma, and the adenocarcinoma. Irregular uterine haemorrhage is the danger signal in both varieties, particularly if this occurs during coitus or other mechanical disturbance. Cancer of the body of the uterus is much less common, occurring in only about 10 per cent. of all uterine cancers. The maximum age incidence is later than in cancer of the cervix, the disease being most commonly found after the menopause. Irregular haemorrhage is again the chief, and may be the only symptom of the disease.

Sarcoma of the uterus is rare, and is not usually to be distinguished from other uterine tumours until the time of operation. It is usually found in elderly women, and the symptoms vary according to its situation.

Ovarian cancer is generally insidious in its onset, and uterine haemorrhage is not likely to be a symptom of importance in diagnosis. Cancer of the Fallopian tube is extremely rare, and presents no characteristic symptoms.

Primary carcinoma of the vagina is also rare, though secondary involvement of the vaginal walls is common enough in the later stages of cancer of both cervix and vulva. The symptoms are indistinguishable from those of cervical carcinoma, but there is no difficulty in diagnosis as the growth is readily palpable. Haemorrhage is not an early symptom of cancer of the vulva,

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endometrium. The condition may possibly result from over-action of the ovaries. It may be asked why the haemorrhage in this group of lesions is so apt to occur about the time of the menopause. The answer is to be found in the fact that atrophic changes are occurring in the uterine muscle and endometrium at this period, and therefore Nature's method of controlling haemorrhage in the uterus is less efficient. In elderly women septic infection of the vagina and uterus is very liable to occur as the atrophic changes in these structures render them less resistant to infection and the normal bactericidal action of the vaginal secretion is to a large extent lost. Purulent discharge is usually the chief feature of these cases, but haemorrhage of irregular type is also occasionally met with.

(b) *New Growths*.—Hyperplasia of the endometrium, whether diffuse or localized, often produces severe uterine haemorrhage, and it has been suggested that the excessive bleeding in these cases may be due to the increased amount of secretion which the hypertrophied endometrium produces, and which acts as a solvent of thrombi. In other words, the bleeding may be the result of an exaggeration of the process believed to occur during the normal menstrual period. Other tumours, whether simple or malignant, may in their early stages produce no gross physical signs, and therefore come into this group, but they need not be further discussed here.

(c) *Functional Haemorrhage about the Menopause*.—It cannot too strongly be emphasized that functional haemorrhage at this period of life should never be assumed until more dangerous organic causes have been excluded. Women vary a good deal in their methods of passing through the menopause. In a few, the menses stop suddenly and that is the end of it. More generally the monthly loss becomes gradually lessened and a period here and there is skipped. In

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some again there may be excessive loss at one period after several have been missed. It may be said, however, that bleeding of irregular type is most unusual, and should always be looked upon as being probably due to a developing neoplasm.

THE INVESTIGATION AND DIAGNOSIS OF CASES OF MENOPAUSAL HÆMORRHAGE.

I propose to consider this part of the subject under the following four headings :

The history.

The general examination.

The preliminary local examination.

The complete local examination.

1. *The History.*—It is a good plan to obtain particulars of the patient's menstrual habit and obstetric history before dealing with her present troubles, as a knowledge of these is essential to an accurate appreciation of her symptoms. Amenorrhœa and dysmenorrhœa will be duly noted. Hæmorrhage may or may not be the chief symptom complained of, and inquiry will be made as to its type, duration and severity. Particular attention will be paid to bleeding of irregular type, and the patient interrogated as to whether it has occurred during straining or, in the case of married women, after coitus. Pain, if present, will be investigated and its character, severity, duration, location and relation to the menstrual periods made out. Severe pelvic pain associated with menorrhagia will usually suggest an inflammatory lesion. The character and duration of any discharge other than the bleeding will be carefully noted. A purulent discharge indicates infection; a foul-smelling discharge, necrotic changes in a new growth or possibly a septic abortion; a watery discharge, the oozing of an ulcerated surface or sometimes an adenomatous polyp. Disturbances of micturition and

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the course of an ordinary vaginal examination, and in such cases a rectal examination will prove invaluable, as it is possible to palpate the whole of the posterior wall of the cervix by this means.

Dilatation of the cervical canal will arouse a suspicion of the presence of an intra-uterine tumour, and this may frequently be palpated through the external os if the patient be examined actually during an attack of haemorrhage. The question of the size, consistence and mobility of the uterus should next be investigated. Fibroids usually produce a noticeable enlargement and the consistency is generally firm, the uterus being freely movable. Endometrioma in the uterine wall will be indistinguishable from a fibroid, but if situated between the uterus and rectum there will be a marked diminution of uterine mobility and a nodular swelling will frequently be felt through the posterior fornix. The soft and indefinite consistence of a pregnant uterus will usually present no difficulty. Cancer of the body of the uterus may or may not lead to some enlargement of that organ. When the growth develops in an atrophic uterus after the menopause the uterus may be quite small, and apart from the suggestive history of bleeding after an established menopause there may be very little upon which to found a definite diagnosis. In the chronic metritic group of lesions the uterus may or may not be large and the consistence will be found to vary, so here the findings on vaginal examination will be largely negative. Palpation of the uterine appendages may reveal enlargement or fixation of the tubes or ovaries indicating the presence of adnexal tumours or inflammatory lesions.

If the preliminary examination has revealed the presence of no gross disease the medical attendant has to decide whether he is justified in relying upon medical treatment without further investigation. He will be guided in this by the character and degree of the

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defæcation may indicate pressure on or involvement of bladder or bowel. Information obtained from the patient's history is merely intended to help in the elucidation of the findings on local examination, and must on no account be used as a substitute for them.

2. *The General Examination.*—This will afford information as to the patient's general health and the degree to which this has suffered during the present illness. It will also be possible to exclude constitutional disturbances such as cardiac disease, purpura or hyperthyroidism, which in the absence of any local lesion in the pelvic organs may possibly be responsible for the bleeding.

3. *The Preliminary Local Examination.*—The preliminary local examination must be carried out in all cases of uterine haemorrhage and before any medical treatment is prescribed. Its object will be to discover the presence or otherwise of gross, that is, palpable or visible, disease of the pelvic organs. Inspection and palpation will both be carried out, a speculum being employed to obtain a proper view of the cervix. Growths of the vulva or vagina will easily be recognized. The condition of the cervix requires careful attention. Chronic inflammation imparts a hardness to it but nevertheless it feels tough, is not friable and the bleeding on examination is very slight and mixed with mucus. Polypi growing from the vaginal surface of the cervix or protruding through the external os are usually felt by the examining finger, but occasionally they are so small and soft that they are apt to be overlooked unless viewed through the speculum. Malignant growths are generally friable and bleed freely on examination. Hardness rather than friability may be the sensation conveyed to the examining finger but free haemorrhage is practically always found, the blood escaping from the vagina after the examination. Endocervical carcinoma may be overlooked in

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membrane may be brought away with the curette, in which case the endometrium is evidently atrophic. Curetting is unlikely to cure this condition, and some other treatment will probably be required. On the other hand thick shavings may come away indicating hyperplasia. The hyperplasia may be diffuse or irregular, in the latter case intra-uterine adenomatous polypi being present. The prognosis as regards immediate cure with the curette is good in these cases, but the bleeding not infrequently recurs at a later period.

TREATMENT.

In cases in which a definite organic lesion has been found treatment will be directed towards its removal, and there is usually no great difficulty in coming to a correct decision as to the best method. Benign tumours should be removed surgically when this is possible, as radium and X-ray therapy are apt to produce degenerative changes which may cause severe symptoms. There has been considerable discussion in recent years as to the relative merits of radium and surgery in the treatment of cancer of the cervix, and a careful study of the published statistics shows that there is very little to choose between the best surgical and the best radium figures. The bulk of British gynaecological opinion, however, favours operative treatment, at any rate in early cases, but it must be recognized that the operation, being difficult and extensive, should only be performed by those surgeons who have special experience of it.

Bonney's latest figures show a freedom from recurrence after five years of about 40 per cent. in 214 cases. This takes into account all patients who died following the operation. On a basis of ten years' freedom from recurrence, 57 per cent. of 105 patients surviving operation were alive in ten years. The operative mortality in

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haemorrhage. Bleeding of irregular type should never be treated in this way until the uterus has been explored, whilst menorrhagia, if severe and exsanguinating the patient, is unlikely to react to drugs.

4. *The Complete Local Examination.*—In all cases of metrostaxis and in others in which the preliminary examination has proved unsatisfactory, the patient should be anaesthetized and the genital tract carefully investigated. Bimanual examination may now reveal a pathological condition hitherto overlooked. The cervix will be carefully inspected and the canal explored, a piece being removed from any suspicious areas for histological examination. Cervical polypi will be snipped off and also examined. The uterine cavity will be carefully explored with the curette and any polypi removed if this be practicable. The character of the endometrial scrapings will be carefully noted and they should be preserved for microscopic examination. In cancer of the uterine body the naked eye appearance of the scrapings will generally be sufficient to establish a correct diagnosis as in these cases the growth usually pours out during the curetting and there is free haemorrhage. In such a case it is advisable to proceed at once to a total hysterectomy. Where any doubt exists, however, it will be necessary to postpone further operative measures until the pathologist's report has been received.

Placental fragments in cases of incomplete abortion are usually easy to recognize, and the free haemorrhage which occurs during the preliminary dilatation will suggest the possibility of pregnancy. Recognition of chorionic villi on microscopic examination will definitely settle the diagnosis. Apart from the conditions mentioned the appearance of the endometrial fragments will afford valuable information as to the cause of the haemorrhage and the probable efficacy of the curetting as a therapeutic measure. Practically no mucous

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Radium therapy is most useful in these cases, and is followed by a complete cessation of bleeding in at least 75 per cent., relapses being extremely rare. After treatment by radium it is advisable to inform the patient that there may be actual bleeding, or at any rate a haemorrhagic discharge, for six or eight weeks following the application. Contra-indications to the use of radium are chronic cervicitis and laceration of the cervix with an inflamed erosion and much discharge; also any co-existent salpingitis. In the latter, acute salpingitis may be set up by the radium applications.

Finally, hysterectomy has to be considered. It is a method of treatment having many great advantages, because if the operation be a total one, it removes all risk of the subsequent development of carcinoma. Vaginal hysterectomy has gone out of fashion, but there is a definite place for it in functional haemorrhages. Hysterectomy is a much more serious procedure than the application of radium, and should be reserved for those cases in which the condition of the cervix is unhealthy or the appendages adherent.

CONCLUSION.

Cases of bleeding about the menopause fall into two groups: those with gross lesions and those without. In the former, treatment will be easy provided the lesion can be excised. In the second group the problem of investigation and treatment is much more difficult. The practitioner's first duty is to exclude all possibility of the existence of malignant disease, and for this some exploratory procedure under anaesthesia will frequently be called for. If this investigation be negative, medical treatment may be tried for a long or short period, according to the severity of the bleeding, and if unsuccessful should be followed by more radical procedures, such as radium or hysterectomy.

this series was 19 per cent. Heyman of Stockholm, for 36 operable cases treated by radium, gives a freedom from recurrence after five years of 40·5 per cent., and for 234 inoperable cases a freedom from recurrence after the same period in 16·7 per cent. Grayward and Schmitz, for 35 operable cases, had a freedom from recurrence after five years of 60 per cent., and in 55 advanced cases a freedom from recurrence after the same period of 14·5 per cent. These two groups of radium figures are by far the best published and are really better than the best figures for surgical operations. The results of radium treatment as carried out in this country, however, are not nearly so favourable.

In cancer of the body of the uterus, all authorities are agreed that panhysterectomy is the best method of treatment, and the results are much better than in cancer of the cervix.

The most difficult problem as regards treatment will arise in those cases in which no gross lesion has been discovered. In the course of the complete local examination the uterus will be explored with the curette, and if no malignant neoplasm be found the inner surface will be thoroughly scraped. This should prove to be curative in a certain proportion of cases, but it has to be admitted that curetting is much less successful as a therapeutic measure about the time of the menopause than in earlier life. If curetting fails to relieve one has to fall back upon drugs, radium or hysterectomy. Drugs are uncertain in their action, but calcium lactate, ergot, hydrastis and pituitary extract may be tried. On physiological grounds an ovarian extract containing follicular secretion, or that from a functioning corpus luteum should have some influence in controlling irregular functional haemorrhage, but results are very disappointing, possibly because most of the commercial preparations are made from ovaries removed at the wrong period of the sexual cycle.

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way of losing weight?" The answer must be: "Through dieting alone can the fat man lose his burden, though systems of exercise, Bergonie chairs, baths, spas, pills and potions may assist the process." Now diets, like dress clothes, need to be fitted to the owner.

The wise dietitian will consult his patient's wishes and constitution before embarking on any particular method. No one would, of course, attempt to reduce in weight those who are suffering from a wasting disease, such as tuberculosis, diabetes or cancer. The mentally weak, the melancholic or the markedly neurasthenic are not, as a rule, suitable subjects for a reducing cure. If it is clear that the patient will be happier, healthier and fitter at a lighter weight, that person ought to be reduced.

By a rapid reduction diet we mean one which is capable of causing a greater loss of fat than two or three pounds a week. Slow reduction diets aim at producing a loss of one to two pounds a week over a long period. Each type has its merits and demerits which are instructive to review.

DIETS WHICH REDUCE RAPIDLY.

Because fat is laid down very slowly, its rapid removal must be unphysiological. Wrinkling and bagginess of the skin is apt to occur as the tide of fat subsides, while some muscular and cardiac weakness is inevitable. The devotee of speed in the game of losing weight neither looks so well nor feels so fit as the man who takes it off more slowly; of equal importance perhaps is the fact that he learns very little of the fat-forming qualities of the various articles of food, and is just as likely as formerly to put on weight after he has lost it.

Long Fasts.—The disappearance of 10 to 12 oz. of fat per day can be accomplished by a person of moderate

Dieting the Corpulent.

By W. F. CHRISTIE, M.D.

London, W.

ADIPOSITY of simple or exogenous origin takes years to develop, an increase in weight of a pound a month being an average rate of progress. Since fat comes from food, the plump person need only diet to stop it—the sooner the better. The modern craze for a slender figure, however much we may disapprove of its adoption by normally proportioned people, is a sound hygienic measure for the fat.

The effect of carrying a burden of dead weight, upstairs and down, wherever we go, is seen by each branch of the profession. The physician condemns the strain which is thrown on the heart and circulation, the liability to lung affection, the development of diabetes; the surgeon finds difficulty in obtaining access to anatomical structures and is disturbed by the frequency of herniæ, gall-stones, pancreatitis and ptosis in fat people; the orthopædist finds the bones, joints, ligaments and muscles strained and painful; the gynaecologist and others see cases daily in which the symptoms are purely referable to the obese state. There seems every reason to applaud, therefore, the stout woman who wishes to reduce her form, even although her primary motive should happen to be the improvement of her looks, or merely a desire to wear ready-made clothes.

The onus of correcting over-weight in the general public falls naturally upon the family practitioner. To him, more than to any other, is addressed the question: "What is the surest, quickest and safest

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lost in return for an even more heroic effort than the first.

Short Fasts.—Commencing with a dose of calomel or a blue pill at night, followed by a Seidlitz powder in the morning, no solid food is allowed for three days, but water is taken *ad lib.*; thereafter, one of two procedures may be adopted:

(A) After a few days on a diet which gets rid of the acidosis, a second fast is instituted, which is again stopped on detection of acetone bodies; by alternate fasting and dieting, in accordance with the state of the urine, it will be found that the body acquires the power, in an increasing degree, of oxidizing the products of breaking down fat, with the result that each successive fast can lengthen.

(B) The patient may be weaned on to a slow reduction diet. True, very little fat can be lost in three days, but the rest given to the organs of digestion promotes a sense of well-being which many stout people have not experienced for years.

Semi-starvation.—Ready-made semi-starvation diets rise and wane perennially. The "milk and potato cure" has an approximate calorie value of about 750, being two-thirds less than the maintenance diet of an average woman; because it contains vitamins A, B and C, it is thought to be healthier than others.

The period of dieting lasts twenty-one days, is said to be best adapted for use during the summer months, and a loss of 8-10 lb. in weight is expected. It is carried out on the following lines:—

On waking.—The juice of three oranges and

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activity if he eats nothing at all ; a week's *total abstention* from food, therefore, reduces the weight by 5 to 6 lb. If the water intake is also limited, which it never should be, the weight falls more rapidly, but the difference is regained within a few days after the return to a normal diet.

Absolute fasts from food of not more than seven days' duration appear in practice to be safe enough for healthy people, although acidosis from the incomplete oxidation of fat usually appears on the third day.

The following case is illustrative :

J. M., aged 59, weighed 12 st. 8 lb. when he commenced a week's fast from food ; liquid was limited to some three pints daily. Acetone bodies appeared in the urine on the third day. He felt well throughout the week, was up and about his business, and went for an additional 2-mile walk each evening. He lost 10 lb. in weight; after a few days on a normal diet he regained nearly 4, the total loss of fat being therefore about 6 lb.

For the purpose of fat reduction, total abstention from protein food is quite unnecessary, and is not without danger to the unfit ; for instance, a lady weighing 17 st., who had suffered occasionally from auricular fibrillation, had a threatened attack of cardiac failure at the end of a four-day fast, due doubtless to muscular weakness.

Since the loss of permanent weight after seven days' fasting is only 5 or 6 lbs., some dietitians recommend a fourteen days' *partial* fast. During the first week, the patient is confined to bed on a diet of water, albumen water, clear soup, weak tea with milk but no sugar, and orange juice ; while from the third day a limited supply of protein is added.

During the second week, the patient is allowed up, although not fit for much exertion. Headache, nausea and dizziness are indications of acidosis which necessitate a sudden stop being put to the course. In this way, some 9 or 10 lb. of fat can be

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A loss of 1 to 2 lbs. of fat per week is aimed at. If this is maintained over a sufficiently long period, it will be obvious that any amount can be dissipated. In practice one advises the patient to return for a month to a maintenance diet after the loss of 18 lb.; thereafter, the reducing diet is resumed.

For those who possess a working knowledge of food values, the construction of a scheme for each fat patient is an easy matter. The diet should contain a full ration of proteins, vitamins, mineral salts, roughage and water, but the fats and carbohydrates are reduced a thousand or more calories below the maintenance standard of the individual.

Instead of cream, butter, oil, cheese, animal fats, yolk of egg, sugar, articles made with flour, etc., the holes and corners of an empty stomach are filled with fresh fruits, green vegetables, fresh salads, clear soups, bovril and other items of low calorie content. The diet must not only be balanced and the calories counted, but the menus should be suited to the patient so that he may find them attractive as well as efficient.

The art of writing a dietetic prescription for diabetes, a mere penalty of obesity, is taught in the medical schools, while the primary ailment is apt to receive little attention. Ready-made diets for the reduction of corpulence are therefore given to all types of people living under various conditions; like garments off-the-peg, some suit while others do not.

This difficulty can be overcome to some extent by the use of a "skeleton diet," to which may be added as occasion demands one or more items from a graded list of foodstuffs. The skeleton contains most of those elements which are essential for the maintenance of health and the repair of tissue, but its fuel value is greatly curtailed; if, while living on it, the body burns more of its own fat than 2 lb. a week, the diet should

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one lemon.

Breakfast.—A cup of tea without sugar or milk, but with a slice of lemon if desired. Two or three slices of thin brown bread.

Lunch.—Three small baked potatoes or one large one, into which place a pat of butter and add salt. One tall glass of cold, fresh milk.

Tea.—One to three cups of plain tea, as before.

Dinner.—Potatoes and milk, as at lunch.

For the week following the course, food must be recommenced gradually—eggs, spinach, chicken, etc., and so to a normal diet.

Other examples of the rapid method might be cited. For those who are in a hurry to become thin, who are sound in body and strong in purpose, who have less than a stone of surplus fat to unburden, the rapid method has its appeal. It must be carried out under close medical supervision, which, owing to the unfailing disapproval of the patient's relatives and friends, is best done outside the home.

DIETS WHICH REDUCE SLOWLY.

The corpulent as a class love their meals, although they will often tell you that "really" they "eat nothing at all." The merits of fasting, however brilliant the advocate, are rarely appreciated, for the nightmare of hunger lurks ever in its background.

A slowly-reducing diet gives quite enough to eat, especially if food is thoroughly masticated. Moreover, it is safe; those who follow it feel unusually fit throughout the period of dieting. Its effects, too, are likely to be permanent; because a considerable latitude in the choice of food is permitted, the reducer takes an interest in and learns to avoid those items which are particularly fat-forming. Very seldom do weights go up afterwards.

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A loss of 1 to 2 lbs. of fat per week is aimed at. If this is maintained over a sufficiently long period, it will be obvious that any amount can be dissipated. In practice one advises the patient to return for a month to a maintenance diet after the loss of 15 lbs.; thereafter, the reducing diet is resumed.

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be augmented from the supplementary list, one item at a time.

A SKELETON DIET (VALUE ABOUT 1,200 CALORIES).

High protein, low carbohydrate and fat content.

$\frac{1}{2}$ lb. bread, 1 oz. butter, $\frac{1}{4}$ oz. milk is the total quantity of these articles permitted during the day.

On rising.—A tumblerful of hot water.

8 a.m.—Half a grape fruit; a breakfastcupful of tea or coffee with milk, but no sugar (use saccharine if necessary); one egg, or a small grilled kidney, or fish as at lunch; toast one thin slice; butter, a scrape

11 a.m.—A tumblerful of cold water, or a cup of hot bovril; lemon squash made without sugar, or barley water.

Lunch.—Fish : an average helping of any white fish, boiled, baked or grilled : cod, sole, haddock, plaice, whiting, perch, skate, flounders, bass, smelts, halibut, half a lobster. Bread, wholemeal or standard, one slice. Butter, $\frac{1}{2}$ oz., or two small balls. Fruit—eat it raw; choose one of the following : an apple of average size; a teacupful of raspberries, blackberries, cherries or mulberries; a large banana; two average-sized peaches; one orange; two slices of pineapple; a small bunch of grapes; an average-sized pear.

4 p.m.—Tea, as before; toast, one thin slice dry.

Dinner.—Oysters, six (if desired). Clear soup—beef tea, strained chicken or mutton broth. Meat—cut off all the fat and eat the lean. Must be grilled, boiled, or occasionally

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roasted. No rich gravy or thick sauces are allowed, but clear gravy, mint sauce, horseradish, ketchup may be taken; an average helping of sweetbreads, kidneys, tripe, brains, veal, beef, mutton chops, lamb cutlets, chicken, grouse, partridge, pheasant, pigeon, quail or turkey; the pork butcher's products, including ham, bacon and sausages, are forbidden. Vegetables—two kinds should be available. Take a large helping of cauliflower, cabbage, brussels sprouts, leeks, spinach, mushrooms, tomatoes; but avoid those which grow in pods or underground. A fresh salad of lettuce, cucumber, radish, tomato, made with vinegar, pepper, mustard and a little salt (no oil or egg). Bread, wholemeal or standard, one slice. Fruit, as before. Coffee—black, without sugar.

On retiring.—A tumblerful of hot water, with a little fresh lemon juice added.

SUPPLEMENTARY LIST OF FOODS.

The following have much the same fuel value, viz. between 70 and 80 calories :—

- Eggs, one.
- Butter, one ball ($\frac{1}{3}$ oz.).
- Bread, wholemeal, 1 slice (1 oz.).
- Bread, white, $\frac{1}{2}$ slice (1 oz.).
- Sugar, 4 small lumps ($\frac{2}{3}$ oz.).
- One glass of skimmed milk.
- Half a glass of fresh milk.
- Half a lobster (3 oz.).
- Fish, white (4 oz.).
- Potato, one medium, boiled (3 oz.).
- Peas, green, average help (3 oz.).
- Beans, broad, average help (3 oz.).
- Jam, 1 oz.

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negative by treatment, and, if so, is it (a) by direct action of the drug used on the reagin, or is it (b) by "killing" all *spirocheta pallida* present?

(3) How long will a positive Wassermann reaction remain in the absence of symptoms?

(4) What is the behaviour of the Wassermann reaction in hereditary syphilis?

(1) *Does syphilis occur with a negative Wassermann reaction?*—At once it must be admitted that syphilis may be present in active form when the Wassermann reaction is negative, for this is always the case in the early primary stage, but apart from this aspect, I am convinced that syphilis can and does very occasionally occur without any serological evidence.

A woman brought to me at the Sheffield Royal Hospital her first baby, an infant a few weeks old, with characteristic signs of congenital syphilis, rash, perineal sores, snuffles, etc., the Wassermann reaction being positive in both mother and child. The mother had only been married twelve months, and, as I always do, I asked to see the father, and found that his blood gave a negative reaction. After very careful inquiry from the mother, including the history of her own family (father, mother, sister and brother), I convinced myself that there was no possibility of her having acquired syphilis except from her husband. At a second interview with the latter, he told me he had had syphilis twenty-one years previously in India, and had been treated in the army and discharged as cured. During the whole of this twenty-one years he had never had any sign of disease and had entirely forgotten the infection until I questioned him. This man, in spite of a negative Wassermann reaction and the absence of any symptom, had been capable of infecting his wife at her first conception and producing a syphilitic child.

The second case was that of a boy of 8, who was sent to see me on account of interstitial keratitis. His Wassermann reaction was positive, as was that of his mother. I saw the father, who denied syphilis and who gave a negative Wassermann reaction. I made careful investigations, and again convinced myself that this mother had been infected by her husband (she had had three miscarriages and only one other living child aged 5, who appeared quite well, but who also had a positive Wassermann reaction). I first saw the husband in June 1924, after which date he never appeared again at the clinic, but in January 1925 the casualty officer asked me to look at a patient in the casualty room where I found a man presenting a very large breaking down gumma of the forehead. I recognized him as the father of the case above, and suggested taking another sample of blood as I felt quite sure that

Clinical Interpretation of the Wassermann Reaction.

BY E. FRETSON SKINNER, M.A., M.B., F.R.C.P.
Assistant Physician, Sheffield Royal Hospital, etc.

IT has been said that if a medical practitioner knows all there is to know about syphilis, he need know little else in the way of medicine, and certainly no one will deny that syphilis does account for a great deal of illness, but I think there is a tendency to over-emphasize this aspect of the case. I myself am guilty of such over-emphasis, perhaps more than most, for I have long been in the habit of considering any unusual case as syphilitic until proved otherwise, and in order to ascertain how far syphilis may be held accountable for general diseases, a few months ago I commenced to examine the blood of every patient who presented himself or herself at the general medical out-patient department.

A sample of blood was taken before I saw the case, and during this period 159 examinations were made, with the result that 16 were found to have a positive reaction, i.e. 10 per cent., which, therefore, may be taken as representing the incidence of syphilis in a special group of the population, namely, the hospital group, and when it is realized that one out of every ten patients is possibly syphilitic, the value of the test as a clinical aid becomes very considerable.

In attempting to assess the value of the reaction one or two questions immediately suggest themselves for consideration :—

- (1) Does syphilis occur with a negative Wassermann reaction ?
- (2) Can a positive Wassermann reaction be rendered

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negative by treatment, and, if so, is it (a) by direct action of the drug used on the reagin, or is it (b) by "killing" all *spirocheta pallida* present?

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it would give a positive reaction, but to my surprise it was again returned negative. I may say that I have re-examined this family quite recently, and serologically they react as at first—the mother and two sons giving positive reactions, the father's blood still remaining negative.

These two cases have convinced me that very occasionally syphilis may be present for long periods without the blood showing the characteristic reaction; but such cases are very rare, and, generally speaking, I would say that a Wassermann reaction which remains negative over a period of six months is sufficient evidence of complete absence of syphilis.

A persistent negative Wassermann reaction in an individual who admits infection usually means that treatment was commenced during the primary stage, before the Wassermann reaction became positive, and was efficiently carried out for a period long enough to prevent recurrence. The two cases quoted above are exceptions to this statement, but must be of such rare occurrence that they merely serve to emphasize the rule that a persistently negative Wassermann reaction means no syphilis.

(2) *Can a positive Wassermann reaction be made negative by treatment?*—The response of cases to treatment seems to occur in three different ways, which I have called Types 1, 2 and 3.

The two cases under Type 1 were both primary cases in which the treatment was begun in the early stages, one actually before the Wassermann reaction became positive, and in both it is seen that the reaction, having become negative, remains so up to the time of discharge. In this group of cases there is little doubt that treatment has produced a negative Wassermann reaction by curing the disease, and in these the reaction remains negative permanently.

The second type consists of cases which start treatment in the later stages of the disease with a positive Wassermann reaction already well established.

THE WASSERMANN REACTION

TYPE 1.

No.	Stage.	Dates.	Wassermann.	Treatment.
1202	Primary	Nov. 11, 1920 to Feb. 21, 1921 to April 1, 1921 to June, 1921 to Oct., 1921 to Jan., 1922 to July, 1922	Negative Positive Negative Positive Negative Negative	N.A.B. & Hg. N.A.B. & Hg. Hg. Pills N.A.B. & Hg. Hg. Pills Hg. Pills
831	Primary	Nov., 1919 to March, 1920 to May, 1920 to August, 1920 to Feb., 1921 to March, 1922 to April, 1923	Positive Weak Pos. Negative Negative Negative Negative Negative	N.A.B. & Hg. N.A.B. & Hg. Hg. Pills Hg. Pills Occasional Hg. Pill

In this type there are two sub-classes, one in which the Wassermann reaction becomes negative after a certain amount of treatment, becoming positive with cessation of treatment, being reduced to negativity again with further treatment, and then showing alternate negative and positive phases as treatment is given or withheld. The second sub-class includes cases which begin similarly and show one or two swings between positivity and negativity, but finally become positive and remain positive indefinitely in spite of intensive treatment.

The third type consists of a large class of cases

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THE WASSERMANN REACTION

TYPE 3.

No.	Stage.	Dates.	Wassermann.	Treatment.
954	Tertiary	Feb., 1920 to May, 1920 to Sept., 1920 to Nov., 1920 to Jan., 1921 to March, 1921 to Sept., 1921 to June, 1922 to June, 1923	Positive Positive Positive Positive Positive Positive Positive Positive Positive Positive	N.A.B.; KI; Hg. Hg. Pills & KI N.A.B.; KI; Hg. Hg. Pills & KI N.A.B.; KI; Hg. Hg. Pills & KI Hg. Pills & KI Hg. Pills & KI
1403	Tertiary	Sept., 1921 to Nov., 1921 to Jan., 1922 to March, 1922 to April, 1922 to July, 1922	Positive Positive Positive Positive Positive Positive Positive	N.A.B.; KI; Hg. Hg. Pills & KI N.A.B.; KI; Hg. Hg. Pills & KI N.A.B.; KI; Hg.

Wassermann reaction of long standing—for example, such cases as syphilitic glossitis, gummatous ulcers, the various vascular lesions and many neurological ones, and in this group, I believe, the Wassermann reaction is fixed unalterably no matter how prolonged or how intense the treatment.

In each of the cases illustrated treatment was carried on for two years, during the whole of which time mercury or bismuth was being given, and each had at least three courses of N.A.B. or kharsivan, and yet the Wassermann reaction remained as strongly

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TYPE 2.

No.	Stage.	Dates.	Wassermann.	Treatment.
1353	Secondary	Feb., 1921 to May, 1921 to Sept., 1921 to Feb., 1922 to June, 1922 to Dec., ? to June, 1924 to June, 1925 to Sept., 1925 to Dec., 1925	Positive Negative Negative Positive Negative Negative Weak Pos. Positive Negative Negative	N.A.B. & Hg. Hg. Pills Hg. Pills Hg. Pills Hg. Pills Occasional Pill Hg. Pill N.A.B. & Hg. N.A.B.
1268	Tertiary	Feb., 1921 to April, 1921 to Oct., 1921 to Oct., 1922 to March, 1923 to Nov., 1923 to Feb., 1924 to July, 1924 to Nov., 1924 to March, 1925 to May, 1925 to July, 1925	Positive Positive Negative Weak Pos. Negative Positive Positive Positive Positive Positive Positive Positive	N.A.B. & Hg. Hg. Pills Hg. Pills Hg. Pills None N.A.B. & Hg. Hg. Pills N.A.B. & Hg. Hg. Pills N.A.B. & Hg. Hg. Pills

that come up late in the disease with a positive
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once reappears. One might compare it for the sake of analogy to a pattern drawn on paper with invisible ink which can be made to appear or disappear by appropriate chemical means. Finally, on looking at Type 3 it appears to me that this hypothetical pattern has been "stamped" indelibly on the blood proteins and cannot be altered by any means at present. At least, I feel convinced that I have seen a large number of cases in which the blood remains positive permanently in spite of honest and painstaking efforts to reduce it to negativity by treatment. The behaviour of the blood in these latter types suggests to me that it is more than likely that the change is not produced in the same way as in Type 1. In this type the antigen is killed out and the positive Wassermann-producing tendency is eliminated *ipso facto*, but in the other type, which I call the "pendulum type," it appears possible that the change is due to direct action between the drugs used and the blood serum. This speculation leads naturally to the next question.

(3) *How long will a Wassermann reaction remain positive in the absence of symptoms?*—Such a question is, of course, extremely difficult to answer, since one has usually no knowledge of such cases until some symptom demands attention, and then, on finding a positive Wassermann reaction, only an estimate can be given as to the time it may have been positive without symptoms, but my experience is that the Wassermann reaction may remain positive for many years in complete absence of symptoms. There is direct evidence of such a clinical fact in hereditary syphilis, but for the moment I will leave that aspect aside and confine my remarks to the acquired disease.

In this connection I shall quote two cases illustrating my point:—

In 1918 a mother brought to me a child, 7 weeks old, on account of a genital sore. I examined it and came to the conclusion that

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positive at the end of the two years as at the commencement.

In the correct interpretation of the behaviour of the Wassermann reaction in these three types of cases lies the general evaluation of the test. If my data are correct, and I believe they are, only two explanations offer themselves :—

(1) Either the treatment was insufficient to produce and maintain a negative Wassermann reaction except in very early cases.

(2) Or that the positive Wassermann reaction is due to some change having taken place in the blood proteins, a change which becomes more fixed as time proceeds.

The question at the head of this paragraph, namely—"Can the Wassermann reaction be made negative by treatment?" can now, I think, be answered with some show of evidence. In the early cases where the reaction remains negative after treatment has ceased, it may be assumed logically that the condition has been cured and the spirochetal antigen destroyed. This explanation might also hold for the first sub-class of Type 2, where the reaction finally becomes negative after one or two "swings" during treatment; but when we come to consider the second sub-class of this type the explanation does not appear to me to be satisfactory. The behaviour suggests an analogy with an elastic body whose tension is expressed always in one direction which can be altered by some appropriate force, the removal of which brings about an immediate readjustment of the previous tensile state.

Prolonged action of the syphilitic antigen appears to have "stamped" on the blood a definite pattern reaction which is called "positive," and though this pattern may be temporarily obliterated by intensive treatment, on cessation of the latter the pattern at

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Kolmer. Of 88 children born of syphilitic mothers the Wassermann reaction was positive at birth in 31 and negative in 57. Of the 57 negative, 15 developed syphilis and a positive reaction within three months, whilst 32 remained without signs either clinical or serological for a period of three months, during which they were under observation. So far as my own personal experience goes, I have found that it is, practically speaking, a constant phenomenon that the blood of a mother who has a syphilitic child gives a positive reaction. So constant is this that where, as very often happens, the withdrawal of blood from tiny babies is difficult, I regard the Wassermann reaction of the mother's blood whether positive or negative as reliable evidence of the presence or absence of infection in the child.

The Wassermann reaction has helped in the interpretation of Colles' law, which states that the apparently healthy mother of a syphilitic child can suckle the child without becoming infected, whilst the infection would be conveyed to any other woman who nursed the child. The original explanation given was that the mother was gradually immunized against syphilis during pregnancy, which seems to assume that the embryo has been infected through the sperm directly. I am unable to convince myself of such a possible mode of infection for the size of the *spirocheta pallida* makes it very unlikely that a spermatozoon could harbour within its head such a bulk and yet remain sufficiently active to fertilize an ovum. On the other hand, the human ovum is of sufficient size to contain a *spirocheta pallida* and yet retain its vitality, and spirochetes have, I believe, been observed in unfertilized human ova, so that it is possible that an ovum might be infected before its fertilization. This mode of infection, however, I do not think very likely to be of practical importance since the process of fertilization must be very adversely influenced by the presence of the

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it was a primary chancre. I suspected that it was probably due to digital transference, and all possible sources of infection were examined, that is, mother, father and midwife. The mother gave a strongly positive Wassermann, though she had never had any symptoms previously. After a few weeks it was obvious that my diagnosis was wrong and that the condition of the child was really an ulcerating nævus. I then learned from the mother that fifteen years previously she had had a still-born child by another man and had obviously been infected at this conception. The fact of her positive Wassermann was thus accidentally disclosed. I saw this woman again in September 1926, and found her Wassermann reaction still positive although she had never had any symptoms, nor has the child, now 8 years old, developed any manifestations.

The next case is that of a woman, aged 27, who came to see me in July, 1927, for an acute iritis of the left eye of seven days' duration. I found her blood to give a positive Wassermann though she had never previously shown any signs of disease. She had been married eight years, but there had been no pregnancy. I interviewed her husband and found that he also had a positive Wassermann, and learned that he had been infected in India in 1904, but had been treated and discharged as cured by the Army authorities. Since his discharge he had never had any signs of disease, though in 1911 he had married a previous wife, who died of phthisis in 1918, and there had been no pregnancy in this union either.

Both these cases illustrate the fact that the Wassermann reaction may remain positive for long periods of time in the absence of any symptoms of syphilis, and I consider it probable that a number of cases may have positive reactions for life without the fact ever coming to light.

(4) *What is the behaviour of the Wassermann reaction in hereditary syphilis?*—First of all, can it be said that every case of hereditary syphilis shows a positive Wassermann reaction? To this question I think the answer is certainly in the affirmative. In my experience I cannot recall a case of untreated hereditary syphilis with a negative Wassermann reaction. The two phases of the hereditary disease are best considered separately, and I will refer to the early infantile cases first, since they are related to an interesting pre-Wassermann view, namely, Colles' law. Boas has published very complete statistics of infantile syphilis, and the following figures are his, quoted from

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Another aspect of this difficult problem has been stated in what is known as Profeta's law, which is that "The apparently healthy child of a syphilitic mother cannot be infected by its own mother." These children, although showing no sign of infection at birth or even for a considerable period after birth, in a large number of cases give a positive Wassermann reaction, and must, therefore, be looked upon as cases of latent syphilis, many of them developing interstitial keratitis about the eighth or ninth year, or showing other manifestations of *lues tarda*.

With regard to the second phase of hereditary syphilis, the cases of so-called *lues tarda*, the question arises : "Is the Wassermann reaction always positive ?" Again, so far as my experience goes, I have never met with an untreated case in which the reaction was negative, but here I am entirely dependent on my own cases, and am ready to modify my view if definite evidence is forthcoming of a negative Wassermann in the presence of unequivocal clinical signs.

Next, how long does the reaction remain positive in this type of case, and can it be altered by treatment as in the acquired disease ? At once I may say that, generally speaking, the hereditary cases behave like my third group, that is, they remain serologically stable. Whether this is an absolute stability I am not yet prepared to state, but a large number of cases have remained positive for four or five years of observation, and I have certainly seen congenital syphilitics of adult age with a positive reaction, so that I am inclined to think that the reaction may remain positive for many years, if not for life, though a few case records suggest that in later life the positivity may gradually die out. A certain number of cases of

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spirocheta pallida, and in all probability the life of such an ovum would be very short.

In every case where a congenitally infected embryo is born it is probable that the infection has been conveyed through the placental blood some time after fertilization has occurred, when the impetus of cell division has gained sufficient momentum to carry on in spite of the impediment of the presence of the *spirocheta pallida*. The almost constant occurrence of a positive Wassermann reaction in the mother seems to support this view, but there is still to be explained this fact that such mothers very frequently have no sign or symptom of syphilis themselves, as though all manifestations of the disease have been focused on the embryo. Doubtless some cases may have an intra-vaginal or even an intra-uterine primary sore which, of course, is undisclosed, and which, as in many other cases of primary syphilis, may not be followed by overt manifestations of the disease; but this explanation cannot, I think, account for the large number of cases where syphilitic children are born of mothers in whom the only evidence of disease is a positive Wassermann reaction. That these mothers are really syphilitic is proved by the fact that not infrequently they develop tertiary syphilitic lesions later on.

Not every mother who has a positive Wassermann, nor yet every mother who has obvious syphilis, gives birth to a syphilitic child. Boas reports 17 cases of healthy children born of mothers with a positive reaction, and my own observations comprise the following cases. Between 1919 and 1923 inclusive, i.e. five years, I had under my care 46 pregnant women who were the subject of recent syphilis, and of these 23, or 50 per cent., gave birth to children healthy at birth, and who remained free from disease as long as I had them under observation—periods varying from

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lues tarda do show after treatment a negative reaction which may remain negative for a number of years at any rate, but usually the positive reaction returns.

Of all cases hereditary ones are the most difficult to follow up, and it is disheartening to look back on old cards and find case after case in which repeated letters have been sent asking for reattendance without avail; and, in parenthesis, it might be suggested that the Council of Social Service might do a really useful work in putting their machinery for domiciliary visiting at the disposal of the Ministry of Health, if some way of getting over the "secrecy" label of the venereal clinics could be found. I might conclude, therefore, that in hereditary syphilis the Wassermann reaction is always positive, and in cases of *lues tarda* usually remains positive in spite of treatment. In those cases where it does become negative there is a later tendency for it to become positive again, and still later there may be a tendency for the positive Wassermann to become gradually weaker and finally negative.

I have tried in the foregoing to present some of the facts on which I have formed an opinion as to what the Wassermann reaction means clinically, and how it should be interpreted, and I will summarize the evidence briefly:—

(1) Syphilis may be present in the absence of a positive reaction.

(2) The reaction only becomes positive in the generalized disease.

(3) If it has been positive for any length of time, say three months before treatment is commenced, though it can be made negative it will eventually return to positivity.

(4) Individuals may have a positive reaction for years without symptoms, possibly for ever.

(5) In hereditary syphilis the reaction is always positive and in *lues tarda* tends to remain positive

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for years.

Before stating my actual thesis, I must refer to one other clinical fact which I have not specifically mentioned, but which is included in some of the foregoing evidence. The gummatous ulcer of the leg is definite evidence of the local activity of the *spirocheta pallida*, a statement which will, I think, be agreed to by everyone. The individual presenting such an ulcer will certainly give a positive reaction. Appropriate treatment will rapidly heal the ulcer by killing all the spirochetes and only a scar will remain, and if the ulcer is really healed it will not break down again. In other words, the local disease is cured, but the Wassermann reaction remains positive as before. Similar instances of this clinical fact might be cited, but the above is sufficient to illustrate my meaning. A late manifestation of syphilis is a local disease due to the activity of a colony of spirochetes which have been dormant for years. These can be exterminated by treatment, but the Wassermann reaction is the same, when they are dormant, whilst they are locally active, and after they have been killed. This appears to me to suggest that the reaction does not depend on the continued presence of the spirochete but on some other factor.

Perhaps I shall make my remarks clearer by sketching my ideas as to the march of events in a case of syphilis. Syphilis commences as a local lesion in which spirochetes begin to multiply up to a point when they are strong enough to invade the general lymph and blood stream. At this stage the body tissues respond with the production of an antibody and, either alone or assisted by drugs, gradually overcome the invading organism. But during this fight some of the invaders have built themselves "dug-outs," it may be in bone or brain or heart-muscle or skin, and here they lie surrounded by a wall of inflammatory exudate which

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consists of relatively avascular fibrous tissue, and in these fibrous-tissue "dug-outs" they may lie for years until some chance breaks down their avascular covering and liberates the colony, allowing local growth to commence again with the production of a "tertiary" lesion. These local lesions are not followed by a generalized outbreak because the body possesses a powerful circulating antibody. It appears to me that local trauma, either mechanical, chemical or bacterial, is necessary for the production of the tertiary lesions of syphilis.

Since, after the generalized stage, any spirochetes are locked up in avascular fibrous tissue envelopes, I consider it useless to submit such patients to long courses of treatment in the hope of ridding them of infection. Any intravenous medication can only get at those spirochetes whose fibrous cells have been broken down; it cannot reach those others still shut up in their inflammatory coverings, so that, generally speaking, I consider the healing of a local lesion sufficient in tertiary cases, and such healing can be brought about by a few doses of potassium iodide quite as well as by arsenobenzols, and I think it uneconomical and unfair to the patient to advise long courses of injections at this stage. My conception of syphilis can be represented diagrammatically by a large cone the base of which stands on the bases of a number of smaller inverted cones, the apices representing local lesions, the bases the generalized disease.

It seems to me that the change in the blood, which gives rise to what is called a positive Wassermann reaction, commences when general invasion of the blood-stream occurs, and in a large number of cases continues long after any signs of disease are manifest; and I cannot think it likely that colonies of spirochetes latent for years can have an influence in keeping up this blood state. If this were so, the sudden breaking up of such a latent lesion as well as its subsequent

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healing might be expected to influence the Wassermann reaction in one direction or the other, but this is not so. Consequently, I feel driven to conclude that what gives rise to the Wassermann reaction is a state of the blood or tissue proteins initiated by the general infection, and that its intensity depends on this initial impetus and not on the fortuitous presence of isolated colonies of spirochetes. Wherefore, a positive Wassermann late on in the disease is evidence only of past infection, and does not make obligatory a long course of antisiphilitic treatment, nor does it mean that any particular lesion is necessarily syphilitic.

At present there is no direct evidence of what antibodies are, but their very multiplicity suggests a speculation. When it is realized that in the same small volume of blood-serum may be demonstrated antibodies to plague, to typhoid, to dysentery, and possibly other infections, the conclusion is surely that those properties cannot reside in separate entities, but that there is probably some mechanism by which a single substance can be made to show these varying characteristics. The serum consists of large complex molecules of protein, which molecules are made up of millions of atoms in a constant state of activity limited by physical forces, the particular phase of activity giving an entity to a particular molecule. It seems to me possible, therefore, and in fact probable, that what we mean by antibodies is merely a change in the molecular arrangement of some of the many blood and tissue proteins. Just as a kaleidoscope may show innumerable patterns by the rearrangement of a small number of fragments of coloured glass from very slight changes, so I think the body proteins may show innumerable pattern changes in their molecular arrangement, and possibly, by a variation in the electric charges on their constituent atoms, give rise to changes sufficiently gross to be detectable by laboratory means.

Practical Notes.

The Treatment of Erysipelas with X-Rays.

E. S. Platon, F. W. Schlutz and L. Collins publish an interesting paper on the treatment of erysipelas, based on the observation of 155 cases, and come to important conclusions regarding the therapeutic use of X-rays in this disease. Of the 155 cases, thirty-five in the control group were treated with local application, eighty with X-ray irradiation, thirty with erysipelas antitoxin, and ten with X-rays and antitoxin combined. The efficacy of the X-ray treatment was shown by the prompt return to normal temperature (1·5 days in the irradiated group, as compared with 3·4 days in the control group) and the more rapid disappearance of symptoms such as pain, toxæmia and general malaise (two days in the group treated with X-rays, as compared with eight days in the control group). Extension of the disease occurred less frequently in the irradiated group (21 per cent.) than in the control group (68 per cent.), and such extensions as did occur were slighter. The mortality of patients treated with X-rays (6 per cent.) was only one-fourth of that (23 per cent.) in the control group. Among the patients treated with antitoxin, the temperature returned to normal more quickly, and there was less tendency of the disease to spread than in the control group. The authors' observations indicate that antitoxin and X-ray irradiation are both of definite value in the treatment of erysipelas. The X-rays seem to be especially effective in inhibiting a spread of the disease, and also in promoting a prompt subsidence of temperature and alleviation of symptoms.—(*American Journal of Diseases of Children*, December 1927, p. 1030.)

The Therapeutic Uses of Carbon Dioxide.

J. C. White and L. M. Hurxthal recommend the addition of carbon dioxide to the inspired atmospheric air for all purposes where a respiratory stimulant is desired. Only in resuscitation from carbon monoxide poisoning is it necessary to give it in oxygen rather than in atmospheric air. It is now proven of definite therapeutic value in the rapid elimination of volatile drugs, in stopping prolonged attacks of hiccoughing, in resuscitation of the new-born and as an aid to the expansion of collapsed tissue. There are practically no contra-indications to its use in quantities necessary to produce moderate degrees of hyperpnea.—(*Boston Medical and Surgical Journal*, December 15, 1927, p. 1117.)

The Treatment of Boils.

A. Brandweiner favours the conservative treatment of boils in so far as he reserves surgical measures for those cases in which there is fever and glandular enlargement accompanied by severe pain, or in which the situation of the boil makes other treatment impractical, e.g. the lip. Dr. Brandweiner recommends collemp. saponato-

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salicyl. 10 per cent., or collemp. diachyl. in the early stages of boil formation, and in the later stages linseed poultices to relieve the pain and tension. If an incision is made, it should be large enough to relieve the tension completely. After bursting of a boil, or incision, energetic treatment with sublimate or sulphur is deprecated as likely to over-irritate the surrounding tissues and so cause an ugly scar. Dr. Brandweiner suggests a thorough cleaning of the neighbourhood of the boil with benzine as an alternative, followed by the application of such simple ointments as lanolin, ung. simplex or ung. emoll.—(*Wiener Klinische Wochenschrift*, January 12, 1928, p. 69.)

The Treatment of Acute Intussusception.

V. R. Stephens suggests that manipulative reduction should be attempted in early and moderately advanced cases of intussusception. The degree of severity does not depend on the time element alone and the resultant opportunity for agglutination of surfaces, but on the extent of the process and the firmness of the incarceration and consequent interference with the circulation. After operating on five patients in the usual manner, with one death on the seventh day from an unknown cause, and after reducing two cases by manipulation under fluoroscopic control, with perfect results, Dr. Stephens recommends unhesitatingly the latter method in properly selected cases. If there is failure to reduce, no harm has been done if the procedure has been properly carried out, and appropriate surgical treatment can be instituted immediately.—(*American Journal of Diseases of Children*, January 1928, p. 61.)

Diphtheria Prophylaxis among Asthmatic Patients.

G. L. Waldbott observes that because of the increased popularity of diphtheria immunization, practitioners are quite frequently facing the question of whether or not diphtheria toxin-antitoxin should be administered to asthmatic patients, particularly among children. Dr. Waldbott has found that six asthmatic children who were free from asthmatic symptoms for several months had recurrences of attacks coincidentally with the administration of toxin-antitoxin; in two other children with an allergic family history, the first asthmatic attacks were brought on by toxin-antitoxin administration. The attacks in all cases were of a very severe type, and were not so easily controlled as ordinarily. The skin tests for horse serum were found to be positive; in all cases eosinophilia was present, and in seven of the cases the eosinophilia ranged higher after the injections than before. Dr. Waldbott suggests that it may be possible by giving small desensitizing doses of serum to prevent untoward symptoms from diphtheria prophylaxis in allergic patients.—(*Journal of the American Medical Association*, January 28, 1928, p. 290.)

The Treatment of Whooping-cough.

K. Ochsenius emphasizes the necessity for medication of the nasopharynx in whooping-cough as this is primarily a catarrhal

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PRACTICAL NOTES

Exsanguinated, bed-ridden patients should be treated with intra-uterine radium therapy without being moved. Corpus luteum and ovarian extracts are not so effective as radiation in combating the annoying symptoms of the menopause. Surgery should be resorted to, in the treatment of uterine fibroids, only if X-rays and radium fail.—(*Medical Journal and Record* [New York], March 7, 1928, p. 238.)

The Prevention of Influenza.

R. Blondel points out that in influenza the infection is conveyed by droplets of saliva to the faces of contacts. As a preventive measure, therefore, for the past eight years, during epidemics he has employed in families, schools, and barracks the method of instilling drops of antidiphtheritic serum on the conjunctiva, morning and evening. In cases where catarrh has made it difficult for the viscous serum to pass through the lachrymal ducts into the nose, he employs drops, morning and evening, of a non-irritating antiseptic, such as electrargol, which, unlike collargol, is non-staining, and which is also often effective in the prevention of hay fever; this solution may at the same time be dropped into the nasal passages, the head being held backwards.—(*Gazette des Hôpitaux*, February 25, 1928, p. 286.)

The Treatment of Encephalitis Lethargica.

L. B. Alford reports the results of the treatment by the administration of glucose of forty cases of epidemic encephalitis lethargica in various states from complete somnolence to very mild cases; the series included delirious cases, cases with acute attacks but not delirious, chronic cases, Parkinsonism, behaviour disorders in children, and a miscellaneous group. The more severe cases were benefited, and only six of the cases failed to show some beneficial effect. A 10 per cent. solution of glucose is used—administered intravenously—beginning with 150 c.cm., and quickly increasing the dose to 500 c.cm. Daily injections are preferable, over a period of about fifteen injections. The results of administration of the glucose by the mouth are not so constant or as permanent.—(*Journal of Nervous and Mental Disease* [New York], March 1928, p. 277.)

Tobacco and Its Abuses.

- 1. Golob observes that although many heavy smokers live to old age and show no apparent ill effects from their habit, still other individuals suffer definite harmful results from only moderate smoking.
- 2. The explanation is that the poisoning effects of nicotine are cumulative, and, furthermore, there are marked differences in individual susceptibility to this toxic drug. A considerable number of disturbances are justly attributed to the abuse of tobacco. These abnormalities, arteriosclerosis, digestive complaints, cancer of the esophagus, xerostomia, xerophthalmia, buccal papilloma, buccal papillitis, chronic pharyngitis, spastic constipation, duodenal ulcer syndrome, toxic amblyopia, deafness, tinnitus, and goiter due to thyroid exhaustion are some of the manifestations against nicotine. The curtailment of the

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infection of the upper respiratory tract. Treatment should be directed to combating the excessive mucous secretion. The following prescription is recommended as an astringent:

R.	Collargol	-	-	-	-	0·1g. (grs. iss)
	Protargol	-	-	-	-	0·1g. (grs. iss)
	Aqua dest. ad	-	-	-	-	10 c.cm. (5 iss)

Sig: Five drops to be introduced into each nostril three times a day. The drops should be introduced by means of half a c.cm. eydrop pipette whilst the patient's head is held well back. It is advisable to put the drops in before the patient settles down for the night, in order to ensure the maximum of rest. By this means the sleeping draught so often necessary may frequently be dispensed with. Dr. Ochsenius also paints the throat with a 5 per cent. solution of silver nitrate, or if this cannot be tolerated, producing in some patients an irritative cough, with the following iodine paint:

R.	Potas. iodid.	-	-	-	-	1·0g. (grs. xv)
	Iodine	-	-	-	-	0·3g. (grs. v)
	Ol. menth.	-	-	-	-	gutt. 2.
	Glycerine ad	-	-	-	-	20 c.cm. (5 v)

Every effort should be made, however, to induce toleration to silver nitrate, on account of its more powerful action, by starting, if necessary, with a 2 per cent. solution and gradually increasing the strength.—(*Medizinische Klinik*, January 20, 1928, p. 99.)

The Use of Sanocrysin in Tuberculosis.

D. Murray Lyon publishes the results of employing sanocrysin in the treatment of twenty-two selected cases of tuberculosis, all except three of whom had pulmonary lesions. Expectoration diminished greatly in certain cases, organisms became fewer, and X-ray appearances suggested healing. How much of the improvement was due to sanocrysin was difficult to assess, as, although the patients received no other treatment, they were living in the most favourable sanatorium surroundings. Although the progress looked promising for a time, the gain was limited, and soon the lesions seemed to settle down to a more stationary condition. Dr. Murray Lyon concludes that it would seem that the claim that sanocrysin has a selective affinity for tuberculous lesions is justified, and that administration of the drug may produce at least temporary improvement in the tuberculous individual.—(*Edinburgh Medical Journal*, March 1928, p. 125.)

The Treatment of Uterine Fibroids with X-rays and Radium.

H. B. Philips observes that, in the treatment of uterine fibroids by radiotherapy, large size is no contra-indication. Repeated small dose technique accomplishes more, with less disturbing symptoms, than the methods formerly used. Supplementary radiation of the spleen and pituitary gland control persistent bleeding promptly.

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PRACTICAL NOTES

The Treatment of Pneumococcal Meningitis.

J. Harkavy insists that, contrary to the accepted belief, pneumococcal meningitis is not uniformly fatal, and gives details of a case which recovered after being treated with injections of Felton's serum (the specific serum for pneumococcal infections prepared by Dr. Felton of Harvard University). The serum was first injected into the spinal canal, but after the development of a temporary block, probably due to adhesions, it was introduced intracisternally, with prompt sterilization of the cerebrospinal fluid. Dr. Harkavy states that the early diagnosis and the identification of the invading organisms is of supreme importance. The specific serum therapy employed should be definitely potent and should be promptly instituted. The serum should reach all foci of infection in the subarachnoid space. When adhesions are suspected it should be administered intracisternally as well as intraspinally. Drainage of the cerebrospinal fluid by both routes is an essential aid.—(*Journal of the American Medical Association*, February 25, 1928, p. 597.)

The Treatment of Scarlet Fever.

R. C. Eley publishes the results of a study of 465 consecutive cases of scarlet fever, of which 215 were treated with anti-toxin or a combined anti-toxin and bactericidal serum. This treatment is stated to give excellent results, the temperature falling within 24 to 48 hours and the general condition of the patient improving definitely. A second dose of the serum was given if there was no improvement after 48 hours. In serious cases the serum should be given intravenously or else both intravenously and intramuscularly together. The dose depends on the severity of the attack and the age and condition of the patient.—(*American Journal of Diseases of Children*, January 1928, p. 14.)

Synthalin in the Treatment of Diabetes Mellitus.

G. G. Duncan publishes a report on seven cases of diabetes mellitus treated by the administration of synthalin, a guanidin compound which has been recently introduced as a substitute for insulin. The synthalin, in doses of 10 mg. and higher, was given orally immediately before meals; it was slower in its effect than insulin, but the effect was more prolonged. Dr. Duncan has come to the conclusion that there is no doubt but that synthalin affects the level of the blood sugar. It cannot be used as a substitute for insulin in the treatment of coma, nor will it prevent a patient with severe diabetes from going into coma. It in no way detracts from the necessity for accurate dietetic control, with proper distribution and timing of insulin administration. At present, says Dr. Duncan, one feels justified in using synthalin in every case of diabetes; in four of his cases the number of doses of insulin was reduced, and in two cases insulin was eliminated entirely. The fact that it can be administered orally is the chief relief synthalin gives to the patient, but probably the best feature of its use is that it enlarges the

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abuse of tobacco, says Dr. Golob, should constitute an important part of preventive medicine.—(*Medical Times* [New York], March 1928, p. 59.)

Migraine and its Treatment.

D. Döllken holds the view that migraine is dependent upon disturbances in the tension in, and conditions of equilibrium between, the three types of cerebral vessels. These disturbances consist in a contraction of the arteries, associated with dilatation and increased permeability of the capillaries and dilatation of the veins. Histamine, a poison which produces just these changes in blood vessels, will, on injection, give rise to typical attacks of migraine. Dr. Döllken has found that small doses of the nitrites—which, whilst dilating all blood vessels, do not increase their permeability—of great value in controlling migraine. He has found that over 80 per cent. of cases of migraine could be completely controlled provided the nitrites were taken regularly over a long period. Tablets of nitro-glycerine, each containing 0·5 mg., are usually prescribed, half of one of these to be taken after breakfast and the other half after the midday meal. Occasionally in severe cases it is necessary to give a third dose in the evening. Patients are instructed to chew the tablets, not to swallow them, as absorption takes place a little more readily from the mouth than from the stomach.—(*München Medizinische Wochenschrift*, February 17, 1928, p. 291.)

The Control of Hæmoptysis.

F. Giuffrida recommends the use of adrenaline introduced directly into the trachea as an efficient means of controlling hæmoptysis. He claims that if given in this way adrenaline does not cause a rise in the general blood pressure, its action being a purely local one on the bronchial arteries. The dosage suggested is 1 mg. of adrenaline twice a day until the haemorrhage ceases. This is most conveniently given in the form of a solution of 1 c.cm. of a 1-in-1,000 solution of adrenaline in 2 c.cm. of water. It is rarely necessary to give more than two injections. Dr. Giuffrida has had successful results by this treatment alone in forty-five out of fifty cases of hæmoptysis due to tuberculosis.—(*München Medizinische Wochenschrift*, February 17, 1928, p. 302.)

Blood Transfusion in Obstetrics.

M. Lévy-Solal and A. T. Tzanck report a series of 26 cases of complications of child-birth successfully treated by blood transfusion; the series of cases includes 6 cases of post-partum haemorrhage, 7 of haemorrhage after abortion, 3 of shock an hour after haemorrhage, 3 of placenta prævia, 2 of severe anaemia and 5 of extra-uterine pregnancy. Sodium citrate is not used, as the authors consider it to have a toxic effect in large quantities. The method used by them is the slow transfusion from arm to arm of pure blood in such quantity as may seem necessary.—(*Paris Médicale*, December 10, 1927, p. 1,505.)

Reviews of Books.

Recent Advances in Tropical Medicine. By SIR LEONARD ROGERS, C.I.E., M.D., F.R.C.S., F.R.S. Pp. viii and 398. London : J. & A. Churchill. 12s. 6d. net.

THE publishers have been well advised to include a volume on tropical medicine in their "Recent Advances" series, for there is much progress in this branch of medicine, and they have been fortunate in securing Sir Leonard Rogers as the author. He gives lucid and illuminating accounts of all the principal diseases, each account comprising an historical introduction, distribution, methods of transmission and diagnosis, followed by recent developments in treatment and prophylaxis. Malaria has fifty pages allotted to it. Cholera is dealt with very fully and the author summarizes his recent observations on the epidemiology of the disease. Under plague, recent observations on epidemiology are included, but the author is unable to record any advance in methods of treatment—kala-azar, the dysenteries, undulant fever, tick typhus, dengue, several helminthic diseases, beriberi, pellagra and leprosy are all included. The book is well produced and well illustrated ; we have read it with much interest and can recommend it as a thoroughly practical handbook on tropical diseases.

The Struggles of Male Adolescence. By C. STANFORD READ, M.D. Pp. 247. London : George Allen and Unwin, Ltd. 7s. 6d. net.

HOWEVER much the different schools of psychotherapy may differ as to the etiology of the neuroses, they are all agreed upon one thing, and that is the fundamental importance of emotional factors in the early years of life. Treatment by asafoetida or by Weir-Mitchellism has now given place to exhaustive investigation of parental influences, early sex difficulties, love attachments and kindred agencies. In this book Dr. Stanford Read has given a general survey of these moulding forces. He is not a whole-hearted supporter of any particular theory or of any one form of treatment, but recognizes the value of all modern methods in appropriate cases. The scope of the book is wider than the title would suggest, and there is in it much excellent advice which parents, teachers and others who have to do with the upbringing and education of both boys and girls will read with advantage. For the practising psychotherapeutist there is scarcely sufficient detail, but the general practitioner lacking time to read longer books will find this synopsis helpful and stimulating. The addition of a bibliography is to be recommended in future editions, as specific references to other writers are scanty.

Physical Diagnosis. By CHARLES PHILLIPS EMERSON, A.B., M.D. Pp. 553. London : J. B. Lippincott Company. 35s. net.

In spite of the growing tendency of the clinician to rely upon instrumental and laboratory methods in dealing with his cases, the

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"non-insulin" group of diabetic patients.—(*American Journal of the Medical Sciences*, February 1928, p. 196.)

The Treatment of Carbohydrate Indigestion.

E. S. Emery observes that a failure in digestion of the carbohydrates produces quite characteristic symptoms when the condition is marked; these consist of alternating constipation and diarrhoea, associated with a great deal of distension and gurgling in the lower abdomen. When the symptoms are severe, the stools are quite striking, the essential points in their examination being the increased amount of starch, the presence of iodine-staining organisms and the tendency of the stools to ferment. The treatment is simple and consists in the complete removal of all starches from the diet. Ordinarily the diet of protein and fat need be continued for ten days, after which time a few slices of well-toasted bread may be added. If this is well borne, after three or four days the patient may be given a little cereal. Occasionally the symptoms may vary, and it is necessary to return to a starch-free diet for another ten days; usually, however, the starches can be increased fairly rapidly until a normal diet is being taken. After enough starch has been added to make the diet more palatable, it is safer to add the 3 to 10 per cent. vegetables before allowing a larger amount of the pure carbohydrates. Potatoes should be permitted last of all. Under this treatment symptoms subside rapidly.—(*New England Journal of Medicine*, March 15, 1928, p. 181.)

The Treatment of Cancer of the Oesophagus.

J. Guisez reports 11 cases of cancer of the oesophagus in which treatment by radium has given relief for over four years (in 4 cases for over six years), and in every case deglutition has remained normal up to the present. In every case the diagnosis was made by endoscopy and verified by biopsy. Such results cannot be looked for, however, except in cases where the growth has not gone beyond the limits of the oesophagus. In less favourable cases radium treatment has brought about disappearance of the dysphagia and at least given the patient a temporary feeling of well-being. Such a result is better than the results of gastrostomy.—(*Le Progrès Médical*, February 25, 1928, p. 336.)

The Treatment of Hodgkin's Disease.

L. Lortat-Jacob and P. Schmitte have successfully treated a patient suffering from Hodgkin's disease with injections of serum from another patient suffering from the same disease who had been treated by X-rays. After two series of injections the blood condition improved practically to normal. X-ray treatment was then given to the patient, and after a course of twenty-four applications he was apparently cured of the disease.—(*Paris Médicale*, December 3, 1927, p. 452.)

Preparations, Inventions, Etc.

LIVER EXTRACT B.D.H.

(London : The British Drug Houses, Ltd., 16-30, Graham Street, N.I.)

In the last decade the only advance in therapeutics that can be compared with the introduction of insulin by Banting, is the method of treating pernicious anaemia by the administration of liver, first brought forward so recently as 1926 by Minot and Murphy. In those cases in which the patient is able to tolerate the liver diet, most encouraging results have followed its regular administration. The chief drawback of the treatment is that many patients have difficulty in tolerating a daily ration of half a pound of liver, which is the smallest quantity recommended to produce good results, and the production on a commercial scale of an active powdered liver extract, containing the therapeutic principle of the fresh liver in small bulk, is an advance of the greatest importance in this method of treatment. Clinical trials have been made of liver extract in various hospitals throughout the country, under the direction of the Medical Research Council, and the results were reported on recently in the medical journals. Of the 34 cases treated, 32 responded to the treatment, but 9 of these were ruled out owing to complications such as a possibility of natural remissions and the influence of some previous treatment; in 23 cases, however, the improvement could be attributed to one cause only—namely, the administration of the liver extract, the daily dose given being the equivalent of half a pound of fresh liver. Professor F. R. Fraser and other physicians and research workers have confirmed the value of liver extract. The extract is administered by the mouth, and is best given in hot water in the same way as meat extract, with condiments to suit the individual palate. Liver Extract B.D.H. is issued in glass tubes, each containing one daily dose, the equivalent of half a pound of fresh raw liver, and the tubes are supplied in boxes of three and of six.

CAPROKOL ANTISEPTIC SOLUTION S.T. 37.

(London : The British Drug Houses, Ltd., 16-30, Graham Street, N.I.)

Caprokol Antiseptic Solution S.T. 37 is a solution of caprokol in a mixture of water and glycerine, possessing the very low surface tension of 37 dynes (water being 77) per square centimetre. Caprokol is a powerful surface tension reducent and also a strong disinfectant, having a carbolic acid coefficient of 72; yet it is non-toxic. Solution S.T. 37 is therefore also non-toxic, and is non-irritating, odourless, colourless, stainless and non-corrosive. We find that its application in full strength to open wounds and denuded surfaces does not cause irritation or injury of any kind. It may be recom-

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day of physical diagnosis is by no means gone. This book will be welcomed by all medical men who believe that the practice of medicine is not only a science, but also an art, and who realize that physical diagnosis is, and must always be, the fundamental method of investigation. The author briefly points out that the history of internal medicine has in a peculiar sense been the history of physical diagnosis, and he very rightly, in his introductory remarks, pays tribute to the great masters and pioneers of past times. The influence of such men as Skoda, Laennec, Flint and Sydenham, to mention only a few, is described in an interesting manner. After the introduction the author deals in Chapter II with "relatively permanent, general physical characteristics," and devotes the remaining six chapters of the book to an exhaustive description of the various regions of the human body. Thus the general body surfaces, the head, the spine and thorax, the heart, the abdomen, and the extremities are dealt with individually.

The book is clearly written, and is accurate in detail. It must appeal to all members of the profession, as it will be found useful by those engaged in consulting, specialist and general practice alike. We recommend it strongly.

Gynecology. By HOWARD KELLY, M.D., and collaborators. Pp. 1012, illustrated. London: D. Appleton & Co. 50s. net.

It was a happy thought on the part of Dr. Kelly to add yet another contribution to the literature of gynecology, and to give to the literary student the fruits of a long experience. Of the forty-nine chapters composing the book, eighteen are written by Dr. Kelly, and the remainder by his collaborators. Like the majority of books written by different contributors, the chapters are of unequal merit, and it may be suggested that endocrinology is hardly up to the standard of the rest of the volume. In addition to the subjects usually treated in books on gynecology, protein therapy, radium, pneumoperitoneal roentgenography, ultra-violet radiation, electrotherapy, psychiatry and mental hygiene are separately considered, while Dr. Rubin, in a chapter entitled "Peruterine Tubal Insufflation in Sterility," describes the technique which he uses for this purpose. The influence of German methods and German teaching is predominant throughout this volume, and although Dr. Kelly does refer here and there to the work of British authors, yet his colleagues do not seem to have such an extensive knowledge of the literature. One observes that endometrioma are considered in a separate chapter, but it may be pointed out that Sampson's implantation theory does not, and cannot, explain the occurrence of endometrioma in all situations. This book is very well illustrated, for Dr. Kelly (who, as he tells us in his preface, lured the artist, Max Broedel, from the Fatherland) has been a pioneer in the production of what may be termed the "medical picture-book."

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1928

Cancer of the Larynx, Intrinsic and Extrinsic: With Remarks on Diagnosis and Treatment.

By SIR WILLIAM MILLIGAN, M.D., LL.D.

*Consulting Laryngologist to the Manchester Royal Infirmary and to
the Manchester Radium Institute, etc.*

ACCORDING to the Registrar-General's report, there were in England and Wales in the year 1925, 801 deaths from cancer of the larynx amongst males and 191 deaths amongst females; in other words, a proportional rate per 1,000 of all deaths from cancer of 33 in males and 7 in females. In these statistics no differentiation is, however, made between purely intrinsic growths of the larynx and those which are extrinsic in origin. What part, if any, chronic irritation plays in the production of laryngeal cancer, whether carcinomatous or sarcomatous, is a moot point. One definite fact, in my experience at least, is that in the vast majority of the cases coming under my own observation the patients have been heavy

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mended for use undiluted for application to wounds and abrasions, granulating surfaces and in abscess cavities, and in topical applications to the nose, throat and mouth; diluted with one or two parts it may be used for urethral, bladder or renal pelvic lavage, and, still further diluted, for wet dressings on infected wounds and denuded surfaces.

ZYMOCIDE.

(London : Messrs. Coates & Cooper, 41, Great Tower Street, E.C.3.)

Zymocide is an antiseptic solution composed of thymol, menthol, boracic acid; oils of spearmint, eucalyptus and winter-green; extracts of witch-hazel, calendula and hydrastis; sulphocarbolate of zinc and alcohol. The number of the ingredients gives rather an old-fashioned air to this preparation; and, indeed, it has been favoured by the medical profession, especially in America, for many years, being one of the first products of its kind. In spite of—or it may be because of—its many ingredients we find zymocide a thoroughly dependable antiseptic, and it is particularly pleasant to use, in a weak solution, in the mouth, throat and nose. In many common skin affections, a compress of zymocide quickly brings relief, and in cleansing wounds, cuts and ulcers it allays pain as well as promotes healing.

KEMDENT STERILE TOOTHBRUSH.

(London : The Lavodent Company, Ltd., W.13.)

Every practitioner knows that the ordinary toothbrush, while at first a bulwark against disease, may in time become a menace, because it is very seldom properly sterilized and disinfected. Indeed, it may be stated with confidence that there are very few ordinary toothbrushes in use in the world that are not thoroughly septic, and it is probable that the prevalence of pyorrhœa is due to the way in which the mucous membrane of the gums is irritated by septic toothbrushes. The Kementer sterile toothbrush and sterilizer appears to us to be an excellent device for keeping the toothbrush in a clean and hygienic condition for daily use. The charge in the chamber at the bottom of the sterilizer (which is a sort of tube enclosing the toothbrush) sterilizes the brush and absorbs moisture; it gives off bacteria-destroying fumes and so prevents the growth of micro-organisms. The bristles are also kept firm, without unpleasant harshness, and the toothbrush is always fresh.

ROBB'S NURSERY BISCUITS.

(London : Messrs. Alex. Robb & Co., Ltd., Atkins Road, Clapham Park, S.W.12.)

Robb's Nursery Biscuits have been well known to the medical profession for more than a generation, and increased knowledge of dietetics serves merely to emphasize their usefulness. These biscuits are in the form of small, crisp, miniature loaves, and analysis shows that the biscuits are made of easily digestible materials and are of high nutritive value. Robb's Biscuit Powder is another preparation which is made entirely from the Nursery Biscuits and retains all their essential properties; it is used in the feeding bottle, mixed with water or milk and water.

CANCER OF THE LARYNX

free anastomosis between individual branches. The effluents from the interior of the larynx are, however, few, and lead to two small glands upon either side of its cartilaginous framework from which no communications pass to the general lymphatic circulation. Moreover, for a long period an intrinsic growth does not ulcerate, and hence sepsis is absent. When ulceration does take place, however, and septic infection is super-added to an already existing malignant process, the disease advances rapidly, cartilage is attacked, softens, and breaks down. In extrinsic cancer pyogenic infection occurs at a much earlier stage, hence its more rapid advance and the earlier enlargement of cervical glands.

An intrinsic carcinoma may be defined as a cancer originating in and confined within the larynx proper: in other words, as springing from the mucosa of the ventricular bands, the ventricular recess, the true cords and the subglottic space; while an extrinsic cancer is one which springs from the interarytenoid commissure, the aryepiglottic folds, the sinus pyriformis and the epiglottis, or which invades the larynx from adjacent mucosa. The importance of this differentiation is evident when the question of treatment has to be considered. Many a life has been sacrificed on the altar of ignorance, from a want of recognition of what is strictly intrinsic disease and what is extrinsic. To perform a laryngo-fissure for the removal of a growth which is extrinsic is the height of folly.

Although Chiari has recorded a case of intrinsic carcinoma in a girl of 16, and Garel in a girl of 18, it is unusual to find one present under the age of 40. The vast majority of cases occur between the ages of 40 and 70, and of these a large percentage occur between the ages of 60 and 70. Intrinsic laryngeal carcinoma occurs far more frequently in males than in females. In females it is a rare disease except when it is found invading the larynx from the hypopharynx, when it is,

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smokers and moderate drinkers. How far the all too common practice of smoking amongst women may affect future statistics is impossible to say, but that it may raise the ratio of approximately 1 to 5 is quite probable. That excessive use and strain of the voice is a factor of importance I feel convinced, judging from the number of cases I have seen amongst politicians, lawyers and clergymen. Just as in cancer of the tongue, so also in cancer of the larynx, a previous history of syphilis appears to be a factor of etiological importance. Epithelioma or squamous-celled carcinoma is the type usually met with; in rare instances columnar-celled growths have been found. In my own practice I have never yet seen a case of intrinsic sarcoma of the larynx.

The importance of the early recognition of the disease, whether intrinsic or extrinsic, should require no emphasis; but it is an extraordinary fact that practitioners today, despite all warnings to the contrary, will watch for weeks or even months cases of hoarseness in people coming within the cancerous age without an expert laryngoscopic examination ever having been made. The essence of successful treatment in laryngeal cancer, as in fact in all cancer, is to attack the growth while still local before the cancer cell has had the chance of dissemination to neighbouring glands.

The generally excellent results which today follow excision of a vocal cord for carcinoma, a purely local and intrinsic form of malignancy, are due largely to two main factors : (1) Early recognition of the nature of the disease, and (2) the fact that intercommunication between the lymphatics of the inside and of the outside of the larynx is extremely sparse. It is a mistake, however, to suppose, as is so frequently taught, that there are few lymphatic channels within the larynx itself. The truth is that the interior of the larynx is richly supplied with lymphatics and that there is a

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differentiation of senile tuberculosis from early malignancy, a differentiation not by any means always easily made. To remove a cord under the impression that it is malignant, when in reality it is tuberculous, is a clinical error of the first magnitude; yet I have known the mistake made on more than one occasion.

A differential diagnosis has also at times to be made between syphilis and carcinoma, and between a benign growth, e.g. fibropapilloma, and early malignancy. This leads me to discuss the advisability or otherwise of removing, intralaryngeally, a portion of a growth for microscopic examination. The main objections to doing so are: (1) That unless the deeper portions of the growth are removed the true nature of the disease may not be revealed, and (2) that cutting into the growth may cause the cancer cell to disseminate. As a means of obviating this latter risk it is well to irradiate before attempting the removal of any piece of tissue for microscopic examination. Provided that operative interference follows within a few hours, the risks of dissemination of the cancer cell are negligible. Generally speaking, it may be said that the more cellular the growth, the better the results from radium treatment; the more organized, acellular and fibrous, the more suitable it is for surgical intervention. On the whole it is advisable to judge from clinical appearances, or if a section is deemed necessary, to have the examination made by a pathologist ready and at hand after the larynx has been split open. Any attempt to extirpate the growth by intralaryngeal procedures, either direct or indirect, is almost certainly doomed to failure; although, to be quite fair, successful results have been recorded. It must be obvious, however, that when infiltration of the submucous and muscular tissues has taken place, endolaryngeal removal is unlikely to be successful. Nor in my opinion is removal under suspension laryngoscopy justifiable, the same objection

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of course, not a genuine intrinsic carcinoma. On the true vocal cord the disease usually commences about its middle or anterior third in the neighbourhood of the nodal point, and tends to spread forward towards the anterior commissure and even across the middle line to the opposite cord. It may appear in the form of a circumscribed nodule to all intents like a wart, or there may be a diffuse thickening and infiltration of its mucosa and muscular tissue running along the whole length of the cord. The existing degree of infiltration determines the mobility or otherwise of the cord; but I desire to point out that a freely mobile cord may be, and frequently is, the seat of carcinoma despite the usual teaching that immobility, partial or otherwise, is pathognomonic of the disease. So long as the malignant process is quite superficial, so long in fact as it does not involve the adjacent muscular tissue, so long will the movements of the cord be free. It is of the utmost importance to appreciate this clinical dictum, as a want of its appreciation has been the cause of unnecessary delay in undertaking operative measures. Speaking generally, however, impaired mobility is seen in about one-half of the cases.

An alteration in the voice, huskiness or actual hoarseness, especially if occurring after the age of 40, persisting for a few weeks and not due to obvious catarrhal causes, is a most important indication of a possible early malignancy. So important is this sign that I venture to say it is the bounden duty of the practitioner forthwith to insist upon an expert examination of the larynx. Only by doing so is it possible to clear up a tentative diagnosis. In chronic catarrhal laryngitis there is a general hyperæmia, and possibly diffuse infiltration; whereas in early malignancy of the true cord there is no hyperæmia, only a localized or possibly diffuse thickening with or without impaired mobility. A point of supreme importance is the

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under these very circumstances. Severe secondary haemorrhage some hours after the operation, followed by aspiration of blood into the lungs, actually drowned the patient. I deprecate the use of adrenaline during the operation because, in my experience, it is prone to be followed by reactionary bleeding. The real safeguard is to secure all bleeding points at the time of operation; to forgo closing the wound until the patient is sufficiently out of the anaesthetic to be able to cough freely; and, finally, to administer a generous dose of morphia before he leaves the operating table. At the end of 48 hours, should no untoward symptoms have arisen, the tracheotomy tube may be removed. Whether the thyroid ala should be removed or not is a moot point. In my earlier laryngo-fissures I did not remove it; of late I have invariably done so owing to the fact that experience has taught that its removal facilitates a more certain excision of the growth, and because from a pathological point of view it is not always possible to be sure whether there may not be an early invasion of its structure. I deprecate what is called a window resection of the alar cartilage because it does not afford a sufficient view of the area of disease, and also because if haemorrhage occurs, it is extremely difficult to control owing to the limited exposure.

Another most important factor in the success of the operation is the subsequent posture of the patient in bed. I well remember how the late Sir Henry Butlin and the late Sir Felix Semon used to insist that the correct position was to keep the patient lying on the affected side, flat upon the bed, without any pillow and with the foot of the bed raised on blocks. Experience has shown, however, that the best position by far is for the patient to sit upright in bed supported by a bed-rest and pillows in order that his cough reflex may have full play; in other words, that he may cough

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holding good. Although the growth originates as a rule from the superficial tissues, it may have its origin deep down and close to the perichondrium, and may only come to the surface gradually, a papillomatous efflorescence masking for a time its true nature. A stalactite appearance with heaped-up and white-looking epithelium—in other words, a defined leukoplakia—is highly suggestive of malignancy.

In the performance of a laryngo-fissure several important and debatable points arise for consideration. In the first place, should a preliminary tracheotomy be performed or not? Many operators advise division of the thyroid cartilage without a preliminary tracheotomy, maintaining that it is unnecessary. My own opinion is that it is advisable to perform a low tracheotomy a week or so before the major operation:

- (1) To allow the patient's lungs to get accustomed to the altered method of respiration.
- (2) To prevent aspiration of blood and mucus and to facilitate subsequent endolaryngeal procedures.
- (3) To enable the larynx to be reopened and packed should severe haemorrhage follow removal of the cord.

Haemorrhage following operation, although unusual, is by no means unknown, and several deaths have been recorded owing to the inability of the operator to control it. The nearer to the vocal process the growth is excised, the greater the risk of bleeding from a cut branch of the superior laryngeal artery. Lying, as this artery does, deeply in the substance of the thyroarytenoid muscle and close to the perichondrium, it is difficult to pick up and ligate. Even if ligated, the ligature, owing to unavoidable efforts at swallowing, etc., may slip and severe haemorrhage ensue. Should such an untoward event occur it is an enormous safeguard for the patient to have a tracheotomy tube *in situ*, as the larynx may be instantly reopened and packed. It has been my misfortune to lose a patient

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subsequent condition of the patient (even if the operation is successful) often so pathetic, that the conscientious surgeon naturally hesitates to advise or to perform it. Recent statistics, however, show a steady decrease of post-operative mortality, which may now be stated to be round about 5 per cent., although some authorities put it at a much higher figure. The selection of cases really suitable for laryngectomy has much to do with improving results, a rigid differentiation being now made between what is intrinsic and what is extrinsic or deep pharyngeal carcinoma. That the operation has a definite place in surgery, and that it will take a more prominent place as time goes on and as experience accumulates, is undoubted; but that it ought to be in the hands of a limited number of highly-trained surgeon-laryngologists is my firm conviction.

The following are the considerations which should indicate a total extirpation of the larynx :

- (1) When the larynx is full of cancerous growth.
- (2) When the growth has extended from one vocal cord to the other *via* the anterior commissure.
- (3) When the growth is obviously extending deeply into the subglottic region.
- (4) When the disease has recurred after a previous laryngo-fissure.

In certain advanced cases the performance of a permanent tracheotomy is in the best interests of the patient. Cancer of the larynx varies much in its acuteness, if I may use the expression, and frequently runs a chronic course. So long as the mouth is kept reasonably aseptic and so long as the growth itself does not ulcerate and become infected, the patient may lead a comfortable existence with his tracheotomy tube *in situ*. I have had patients who have lived in comparative comfort for $1\frac{1}{2}$, $2\frac{1}{2}$ and $3\frac{1}{4}$ years after the performance of a tracheotomy. Arteriosclerosis with high blood-pressure, sugar in the urine, extensive involvement of

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up all accumulating secretion. The adoption of this posture has enormously diminished the number of cases of septic and hypostatic pneumonia. The feeding of the patient as a rule presents no great difficulties. It is unusual for dysphagia to be present except in those cases where the vocal process, or even a portion of the arytenoid cartilage, has had to be removed in order to get quite clear of the disease. Where this has been necessary I strongly advocate feeding the patient, for the first three days at least, through a nasal tube introduced at the time of operation.

Laryngo-fissure as a surgical procedure has a limited sphere of usefulness. In suitably selected cases, however, it is an admirable operation, not only from the fact that if properly performed the existing disease may be completely removed, but also because the contour of the larynx is preserved and a quite useful, although somewhat gruff, voice remains. The success of laryngo-fissure depends largely upon the selection of suitable cases; and here the experience and the clinical acumen of the surgeon is the patient's main asset. When, on the other hand, the growth is not strictly local, when it crosses the middle line and invades the opposite cord, when it extends deeply into the subglottic region, when it involves the ala of the thyroid cartilage, or when it is extrinsic, the performance of a laryngo-fissure is not only useless, it is criminal. In such cases the surgeon is faced with the responsibility of advising one or more of the following:

- (1) The introduction of a permanent tracheotomy tube.
- (2) A complete laryngectomy.
- (3) Deep X-ray treatment.
- (4) Radium treatment.

The operation of complete laryngectomy is such a formidable task, its risks are still so great and the

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the laryngeal framework, enlargement and fixation of cervical glands, and marked debility are contraindications to any extensive operation.

Given a case, however, where laryngo-fissure is put out of court owing to the position and extent of the disease, but where a total extirpation appears feasible and favourable, certain problems at once confront the operator :

- (1) Should a preliminary tracheotomy be performed ?
- (2) Should the larynx be removed from above downwards or from below upwards ?
- (3) When removed, should the operation cavity be closed at once or subsequently ?
- (4) Should a general or local anaesthetic be employed ?

To take the last problem first : in this country the administration of general anaesthetics is a fine art and has reached a high level of perfection, while effective and efficient local anaesthesia, for major operations at least, is in its infancy. On the Continent the reverse holds good, and it has been my experience to have seen total extirpations most efficiently carried out by Professor Chiari in Vienna, and Professor Noordenboos in Amsterdam, the cervical and laryngeal structures having been infiltrated with tutoxine or novocaine. Apart from the objection that operating under local anaesthesia is more trying to both the patient and the operator, it has much to recommend it, owing to the less frequent incidence of pneumonia or pulmonary oedema. If local anaesthesia is decided on, the tissues from the hyoid bone to the sternum should be infiltrated and deep injections made in the region of the superior laryngeal nerve. A 0·5 per cent. to 1 per cent. of a sterilized solution of novocaine may be used. A few weeks prior to the major operation all septic teeth should be removed and the mouth frequently washed out with a solution of alcohol. The presence of a septic mouth simply spells disaster. Intratracheal

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insufflation of ether is, I consider, however, the method *par excellence*.

With regard to the performance of a preliminary tracheotomy, if the larynx is to be removed from above downwards, it may be dispensed with; if, on the other hand, removal is to take place from below upwards, it is, to my mind at least, an advantage to perform it. The advantage of performing tracheotomy a week or so before the main operation is not only that the lungs become accustomed to the altered course of respiration, but also that time is given for adhesions to form between the trachea and the soft tissues of the neck, and so possible avenues of infection to the mediastinum are cut off. Enlarged cervical glands should be removed by block dissection, if possible at the same time as the tracheotomy is performed.

My own experience of total extirpation is confined to removal of the larynx from below upwards after the performance of a preliminary tracheotomy, as I think is the custom of most British surgeons. Modern surgery, with its brilliant achievements, has done much to reduce the high mortality of this operation. To my mind, however, it is not so much a question of careful and brilliant technique as a question of judgment as to when to operate and when not to operate. The most brilliant mechanician may have the most unfavourable results if he lacks that all-important quality of good judgment—a quality inherent to some minds, sadly deficient in others.

The treatment of malignant growths with radium or its emanation is no longer in the experimental stage. Methods formerly in use are today discarded in favour of a more modern technique. Surgeons also are slowly but surely appreciating the fact that a malignant and surgically operable growth may be got rid of without mutilation and without loss of function by radium treatment. Experience has shown that irradiation of a

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advisable to retain the tubes *in situ* for six or seven days, but much will depend upon the patient's general and local condition. Rapid changes in the contour of the malignant growth take place, shrinking of its substance being especially noticeable, and in favourable cases it may be found to have entirely disappeared in from six to seven weeks, the vocal cords presenting a practically normal appearance.

My experience of deep X-ray therapy is a very limited and not altogether a satisfactory one, but I am well aware that in certain hands the results have been good. Combined radium and deep X-ray treatment have, however, I believe, a useful future.

Even more difficult than the destruction of the primary focus is the efficient treatment of glandular deposits. Treatment by means of applicators or by radio-puncture, although instrumental in producing an improvement, has not been found curative. Up to the present, block dissection followed by X-ray treatment gives the best results.

Today the successful handling of malignant disease of the upper respiratory passages depends upon the united efforts of the laryngologist, the surgeon and the radiologist. What tomorrow will bring forth is on the lap of the gods.

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growth with needles placed in contact with it, or actually inserted into its substance, is much more effective than any superficial application, and also that small doses of the emanation, radon or of a radium salt, carefully screened, and retained *in situ* over prolonged periods are more effective than large doses and short exposures. Whenever possible, the growth should be approached by surgical measures in order that the various radium needles employed may be accurately placed in position. Whether in the future the treatment of a limited intrinsic carcinoma of the larynx with radium will supersede surgical measures, is impossible to say, but the trend of events is marching in that direction. The excellent results obtained from its employment, and the fact that an almost perfect voice is retained, are strong arguments in its favour, always provided, however, that statistics show recurrences to be no more frequent than after laryngo-fissure. Time alone will solve the problem as to which is the more reliable life-preserving method.

To obtain access to the outer surface or base of the malignant vocal cord a window resection of a portion of the thyroid cartilage should be performed. After removal of the cartilage the perichondrium is exposed, and care taken not to perforate it. Five or six needles, each containing a milligram of radium sulphate and screened with 0·6 or 0·3 millimetre of platinum, should then be placed vertically over the exposed perichondrium and at distances of 1 centimetre apart. It is of great importance not to puncture or in any way to injure the perichondrium (Harmer). The threads attached to the tubes are tied together, cut short, and the skin incisions sutured, leaving, however, a small opening through which the needles may ultimately be extracted. Finally, a tracheotomy is performed, since reaction may be considerable, as is evidenced by the occurrence of acute laryngeal oedema. As a rule it is

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advisable to retain the tubes *in situ* for six or seven days, but much will depend upon the patient's general and local condition. Rapid changes in the contour of the malignant growth take place, shrinking of its substance being especially noticeable, and in favourable cases it may be found to have entirely disappeared in from six to seven weeks, the vocal cords presenting a practically normal appearance.

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The Pupil Reactions.

By C. L. GIMBLETT, M.D., M.R.C.P., F.R.C.S.

Assistant Surgeon, Royal Westminster Ophthalmic Hospital.

THE discussion of these important physical signs may be subdivided as follows:

(1) The reaction of the pupils to light, and the nerve path by which it is carried out.

(2) The reaction of the pupils to accommodation, and the mechanism of the Argyll-Robertson pupil.

(3) The action of the sympathetic system.

(4) The size of the pupil, as affected by age, the state of the central nervous system and the action of drugs.

(5) Inequality of the pupils, as caused by local conditions within the eyeball and by lesions affecting the reflex nerve path.

PUPIL REACTIONS TO LIGHT.

The pupil contracts to light directly and consensually.

(a) *The direct reaction.*—The patient, seated near a good light, is asked to look in front of him, keeping both eyes open. Both eyes are obscured by the observer's hands. The right one being uncovered, the reactions of its pupil are observed, the left remaining obscured.

(b) *The consensual reaction.*—By shading one eye and alternately shading and exposing the other it is found that the pupil of the shaded eye (as well as that of the exposed) contracts to the light stimulus.

These are pure reflexes carried out through a constrictor centre only, the nervous path being such that both eyes are affected by light falling upon one retina. The arc, as in other reflexes, consists of afferent (sensory) and efferent (motor) paths with central connections between them.

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Afferent fibres pass from certain small retinal cells, unconnected with visual functions, along the optic nerve to the chiasma, where a partial decussation takes place. Above this point fibres from each retina travel by both optic tracts to both anterior corpora quadrigemina. Nerve fibres for contraction of the pupils to light do not ascend above this level, and make no communication with the external geniculate bodies, which are associated especially with accommodation.

Central connections between the corpora quadrigemina and the anterior parts of the third nerve nuclei (in the floor of the third ventricle) are made by fibres of the posterior longitudinal bundles.

The efferent path of the reflex is the oculomotor (third) nerve and its nucleus. The cells from which the fibres to the constrictor pupillæ arise are situated anteriorly in the nucleus—so near to the middle-line as to be almost common to the two sides. Their axons pass in the nerve around the crus cerebri, and, piercing the dura, travel in the outer wall of the cavernous sinus to the sphenoidal fissure. Entering the orbit they reach the ciliary ganglion and travel by the ciliary nerves, to supply the constrictor pupillæ, which consists of circular plain muscle fibres arranged around the pupil opening.

Evidence for the afferent path rests upon clinical facts under normal and pathological conditions :

(a) In a lesion of one optic nerve below the chiasma (producing blindness of one eye) the consensual reaction of the pupil to light can be obtained, although its direct reaction is lost.

(b) In a lesion of one optic tract above the chiasma (producing homonymous hemianopia) corresponding halves of the retinae become blind. Light thrown upon the blind half of either retina produces no contraction of either pupil, but thrown upon the normal half of either retina produces contraction of

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quadrigemina and posterior longitudinal bundles, may be responsible for the Argyll-Robertson pupil. In the later stages of tabes a "spinal miosis" is present, in which the pupils are eccentric inactive to light, and so small that their reaction to accommodation becomes unobtainable. Their margins are also often irregular.

ACTION OF THE SYMPATHETIC.

The dilator pupillæ, a layer of plain muscle fibres close to the posterior surface of the iris radiating outwards from the pupil margin, is supplied by branches of the cervical sympathetic, the nerve fibres of which have arrived at this position by a complicated course from the first and second dorsal segments of the spinal cord. White rami communicantes join the sympathetic chain as it passes upwards in the thorax upon the heads of the ribs in relation to the parietal pleura. Reaching the subclavian artery, the sympathetic forms the annulus of Vieussens around it and continues upwards in the neck upon the muscles which arise from the anterior tubercles of the transverse processes of the cervical vertebrae, lying behind the carotid artery and jugular vein. At the foramen lacerum medium of the skull a plexus is formed which accompanies the internal carotid through the petrous bone to the cavernous sinus. A branch from this plexus passes through the sphenoidal fissure to form the sympathetic root of the ciliary ganglion, from whence fibres reach the dilator pupillæ by way of its ciliary branches.

THE SIZE OF THE PUPILS.

The size of the pupils varies with age and the condition of the central nervous system as well as with accommodation and intensity of illumination. It is also affected by drugs.

(a) *Age*.—In infancy the pupils are contracted, in early adult life often widely dilated, while in old age

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both pupils.

Supposing a decussation of the afferent fibres of the light reflex arc to occur at the chiasma, both these phenomena are explained.

THE ARGYLL-ROBERTSON PUPIL.

In contradistinction to their reaction to light, constriction of the pupils to accommodation is not a reflex, but a series of co-ordinated muscle actions, which includes constriction of the pupils, contraction of the ciliary muscles and convergence of the visual axes. This synergic act originates with the idea of "near vision" in the cerebral cortex. The descending nerve path from the Rolandic area to the eye muscles passes through the posterior part of the internal capsule to the external geniculate body and optic thalamus, and thence to the third nucleus along the posterior longitudinal bundle, where a decussation takes place. This path does not pass through the anterior corpus quadrigeminum—the special path of the light reflex arc.

Constriction of the pupils on accommodation, not being a reflex, is retained in diseases, such as tabes, in which reflexes of all types tend to be lost. The direct synergic path from the cortex through the geniculate and optic thalamus to the third nucleus remains intact, while lesions in the neighbourhood of the corpus quadrigeminum, or its connection with the third nucleus, tend to destroy the reflex path. The lesion is not in the optic tracts, because sight remains good without hemianopia or other physical signs of their involvement.

The above anatomical explanation suggests that the tabetic pupil might be present on one side only—as is often seen in Charcot's arthropathy. It is thought that chronic inflammation of the ependyma of the posterior part of the third ventricle and "iter," producing gummatous fibrosis in the region of the corpora

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iris become torn. The pupil is permanently altered in size and sluggish in reaction, while its position is slightly eccentric and its margin irregular.

(1) The dilator pupillæ tears at the periphery of the iris—its thinnest part—with the formation of a “black crescent” in this situation (iridodialysis). A view of the fundus can be obtained through this gap as well as through the pupil. The segment of iris affected becomes inactive, and its margin irregularly flattened, the normal circular outline being lost.

(2) The constrictor pupillæ usually tears at the pupil margin; if severely, the pupil becomes widely dilated and entirely inactive to light, both directly and consensually, while it does not contract to accommodation. Such a pupil is *more* inactive than that of a blind eye.

Many lesser degrees of trauma exist in which only a few fibres are torn. Such a pupil—a little dilated, reacting sluggishly to light and contracting somewhat ineffectively to accommodation—is, far more often than is supposed, considered as due to syphilis.

(b) *Drugs.*—Clinical doses of the alkaloids of atropine, eserine, cocaine and perhaps adrenaline, are common causes of inequality of the pupils. Instillation is usually clinical, but may occasionally be accidental or even fraudulent. The presence of the drug alters visual acuity by affecting the ciliary muscle, which somewhat alarms a patient unaware of the cause of his sudden inability to use one eye. Accidental sources are liniment prescribed for lumbago, or eye ointment ordered for some other member of the family. The right eye is usually affected in such patients. The effect of atropine lasts ten days, and in an elderly person may result in a rise of intraocular tension, so that instruction as to the care of the hands should be given to patients using liniments. The nerve-endings in the muscles are the points of action of these drugs;

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they become, as a rule, small once more.

(b) *Central nervous system*.—Dilatation of the pupil occurs in emotions, such as anger or fear, and follows the excitation of sensory nerves. Constantly seen in the presence of pain, as in biliary or renal colic, it may be used as a test of its genuine severity. Anæsthesia provides a series of changes in the size of the pupils. During the first “excitement” stage they are dilated, in the second “surgical” stage contraction is present, while in the third stage—and in all states of “exhaustion” such as alcoholic coma and immediately preceding death—the pupils become widely dilated. During sleep, contrary to expectation, the pupils are constricted, the eyes are rolled upwards, and the visual axes convergent, hence the constriction is considered part of a synergic act.

(c) *Drugs*.—The actions of the alkaloids of atropine and cocaine to produce dilatation, and of those of pilocarpine to cause constriction, will be referred to when considering inequality of the pupils. The alkaloids of opium produce marked pupillo-constriction when given in clinical doses for the relief of pain—not by any local action on the pupil, for no constriction follows their instillation into the conjunctival sac, but by an effect upon the central nervous system (probably the basal ganglia).

INEQUALITY OF THE PUPILS.

The causes of inequality of the pupils, both in size and reaction, may be peripheral in the eyes themselves, or in the sensory and motor nervous paths or their central connections.

I. Locally in the Eyeball :

(a) *Trauma*—not syphilis—is the commonest cause of inequality of the pupils. As the result of a blow—which need not have been severe—muscle fibres of the

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II. In the Sensory Path :

(a) *Retrobulbar neuritis*.—Inflammation of one optic nerve will give rise to a pupil which contracts to light, but the reaction is not maintained. This is associated with pain on moving the eyeball or on stooping forward, and lowered visual acuity, with scotoma for white or colours in the visual fields, and is unaccompanied by any but the slightest fundus change. The condition may be uniocular or binocular—the former being usually of the acute, the latter of the chronic variety. Toxæmia, the usual cause, may be endogenous, as in renal disease, diabetes or puerperal conditions, or exogenous—the example of the latter most commonly seen is tobacco amblyopia. A second cause—disseminated sclerosis—should always be remembered. Abnormal pupil reactions with scotoma in the visual fields (and perhaps nystagmus) are never hysterical (however well the patient may have been educated by repeated investigations), and their discovery at once puts this diagnosis out of court.

(b) *Optic atrophy* is a progressive condition resulting finally in an eye blind to light, but the pupil is not thereby rendered inactive. It does not react to light directly, but it does so consensually, and also constricts to accommodation so long as the vision of the other eye remains good. It is only double optic atrophy which shows inactive pupils. These points are sometimes overlooked.

(c) *Lesions of the optic nerve* above and below the chiasma have already been compared, and the mechanism of the Argyll-Robertson pupil described.

III. In the Motor Path :

(a) The *oculomotor* nerve fibres are distributed to intra- and extra-ocular muscles. The former—the constrictor-pupillæ and ciliary muscles—may be affected alone by the diphtheritic toxin, dilated and

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atropine paralyses and eserine stimulates those of the third nerve in the constrictor, while cocaine and adrenaline stimulate those of the sympathetic in the dilator pupillæ—adrenaline only affecting the pupil in pancreatic insufficiency (Levi's test). When the pancreas is normal its internal secretion—present in the blood-stream—is thought to neutralize adrenaline immediately upon absorption.

(c) *Inflammation*.—(1) Inequality of the pupils may be due to the presence of iris adhesions—synechiæ—characteristic of iritis, which are of frequent occurrence and often much more marked in one eye than in the other. A "quiet iritis" may occur and synechiæ form without the patient being able to give any history of a definite "attack." A drop of cocaine—by dilating the pupil—demonstrates the points at which the iris is adherent to the underlying lens.

(2) Within the eyeball (apart from synechiæ) inequality of the pupils may result from glaucoma—increased intraocular tension—in which the pupil becomes dilated (midriasis), eccentric and inactive to light, and the visual acuity finally reduced to no perception of light. This condition is in many chronic cases uniocular, and unaccompanied by pain or conjunctival redness. The shallow anterior chamber, hard eyeball, and reduced visual acuity should make the diagnosis clear.

(d) *Neoplasm*.—Growths of the iris or ciliary body give rise to inactivity of the pupil by partially obstructing its movements. These growths are often quite invisible upon external examination, but inactivity of one section of the iris (apart from iridodialysis or the presence of an intraocular foreign body)—especially if there is irregularity in the depth of the anterior chamber—should make one suspicious. Intraocular neoplasms usually give no symptoms of any kind until a comparatively late stage.

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inactive pupils being associated with inability to do close work. Extra-ocular paralysis—divergent squint, crossed diplopia, and false projection combined with ptosis of the upper lid—may or may not be associated with the intraocular form. The third nerve trunk is sometimes damaged in lesions of the orbit or cavernous sinus (arterio-venous aneurism). Soon after it emerges from the brain the nerve passes between the posterior cerebral and superior cerebellar arteries and is occasionally involved in arterio-sclerosis of these vessels. Lesions of the anterior part of the oculomotor nucleus in the floor of the mid-brain (in encephalitis) give rise to intra- and extra-ocular third-nerve paralysis. The pupils and ciliary muscles are especially likely to be bilaterally affected, as their centres are very near the middle line.

(b) The *sympathetic* nerve fibres control the dilator pupillæ, together with the unstriped muscle in the upper lid, Tenon's capsule and the spheno-maxillary fissure of the orbital floor. Stimulation of these fibres produces dilatation of the pupil retraction of the upper lid and exophthalmos together with increased sweating—the condition seen in exophthalmic goitre, while paralysis of sympathetic is followed by pupillary constriction ptosis and enophthalmos. The condition is almost always unilateral. Integrity of the sympathetic is liable to be affected by trauma, aneurism and tuberculosis. Aneurisms of the subclavian artery or arch of the aorta may produce lesions of the sympathetic, the latter especially affecting the left chain, so that enophthalmos constricted pupil and ptosis frequently accompany the brassy cough and tracheal tug. In pulmonary phthisis the sympathetic is liable to be involved in scarring and pleural adhesions at the apex of the lung. Bullet wounds of the neck frequently injure the sympathetic. It is rather too deeply placed to be often affected by operations, but is occasionally

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involved in cervical lymphadenitis. Alteration of the pupil reactions may also occur in arterio-venous aneurism of the cavernous sinus from interference with the carotid sympathetic plexus. Stimulation tends to occur in the early stages, paralysis in the later. Instillation of cocaine into the conjunctival sacs will produce no effect on the injured side, while on the sound side dilatation, retraction and exophthalmos will occur in a few minutes.

IV. In the Central Connections :

A head injury, whether complicated by concussion or not, is liable to be followed by intradural haemorrhage, the site of which is sometimes difficult to diagnose. As the blood is poured out the pupillary centre is at first stimulated and the pupil constricts. If haemorrhage continues the pupil commences to enlarge and finally becomes widely dilated. In all stages the pupil is rendered sluggish in its reactions. These changes proceed upon both sides, but one side is characteristically in advance of the other. The last stage—in which both pupils are widely dilated and inactive—indicates that the end is rapidly approaching. This associated inequality and inactivity of the pupils—taken in conjunction with the deepening coma, falling pulse-rate, and difference of temperature in the two axillæ—is often useful in diagnosing the presence of intradural haemorrhage and the side on which it is occurring.

In cerebral irritation following concussion, when light is thrown upon the eyes the pupils dilate. The patient's whole central nervous system is aroused by the examination and the pupils dilate from excitement; they are not here reacting to a simple light stimulus.

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inactive pupils being associated with inability to do close work. Extra-ocular paralysis—divergent squint, crossed diplopia, and false projection combined with ptosis of the upper lid—may or may not be associated with the intraocular form. The third nerve trunk is sometimes damaged in lesions of the orbit or cavernous sinus (arterio-venous aneurism). Soon after it emerges from the brain the nerve passes between the posterior cerebral and superior cerebellar arteries and is occasionally involved in arterio-sclerosis of these vessels. Lesions of the anterior part of the oculomotor nucleus in the floor of the mid-brain (in encephalitis) give rise to intra- and extra-ocular third-nerve paralysis. The pupils and ciliary muscles are especially likely to be bilaterally affected, as their centres are very near the middle line.

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rare congenital conditions are occasionally seen, but they are usually easy to recognize, and will therefore not be considered. For practical purposes, we may limit ourselves to the following conditions, which are the most common intra-abdominal lesions met with in the first decade of life :—

- (1) Acute appendicitis.
- (2) Pneumococcal peritonitis.
- (3) Acute intestinal obstruction.
- (4) Intussusception.
- (5) Congenital pyloric stenosis of infancy.

ACUTE APPENDICITIS.

Acute appendicitis is the most common abdominal emergency met with in childhood, and the disease may be seen at the earliest age. It is often difficult to diagnose, and therefore may be a very serious condition, leading to loss of life. The mortality from appendicitis is highest between the ages of five and fifteen years, and this subject is therefore one of special interest. The symptoms of the typical case, where the appendix lies in the common position in the iliac fossa, are well recognized. The onset is usually with pain round the umbilicus or in the epigastrium; vomiting, and later, when there is irritation of the parietal peritoneum, localization of the pain with tenderness, rigidity in the right iliac fossa and temperature of perhaps 100° or 101°. One feature which is characteristic of appendicitis in children is the early appearance of sickness; this sign may be absent in adults, but is invariably present in childhood. Such a straightforward case is easy to recognize and should rarely be missed. Unfortunately, however, many of these cases are regarded as minor disorders of digestion, or as "biliary attacks," and are treated in the early stages with a dose of castor oil. It is only after the injurious effects of this treatment, which has

The Abdominal Emergencies of Childhood.

By A. H. SOUTHAM, M.D., M.CH., F.R.C.S.

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THE problem of the acute abdomen is surrounded by many difficulties, and in no other conditions is early diagnosis so important or delay so dangerous. The diagnosis of abdominal crises in adults is often no easy matter, whilst in children the difficulties are greatly increased by the inability of the patient to give a clear history of the onset or to localize the symptoms correctly. It is therefore necessary to be familiar with the early symptoms of these cases and to understand their significance, in order that a correct diagnosis may be made and effective treatment carried out. It is proposed, in this article in THE PRACTITIONER, to draw attention to some of the earliest and therefore most important signs of these abdominal conditions, as much may be gained by early operation, and one should not wait for the appearance of the later symptoms, for once the abdomen is distended and the patient collapsed from shock and toxic absorption, surgical treatment will be of little avail. In childhood the origin of all these diseases is principally confined to the alimentary canal, and lesions of the upper abdominal and pelvic organs can, to a large extent, be dismissed. Further, the complications associated with malignant disease can be completely excluded from the picture. Certain

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also, the history of the onset of the attack and the progression of the symptoms will assist in the diagnosis, whilst not uncommonly in pelvic cases, frequency of micturition with pain occurs as an early symptom.

One must remember the condition of tabes mesenterica, which in its acute or chronic form is not infrequently mistaken for appendicitis. Acute lymphadenitis is not at all uncommon in children, and though it sometimes simulates appendicitis, it may be recognized by the higher temperature, frequent absence of vomiting, and, in some cases, the presence of palpable glands (which also may be visible by X-rays), whilst the symptoms in these patients usually show a rapid return to normal. Under some circumstances a correct diagnosis may be impossible, and the risk of operation being slight, it is wiser to perform a laparotomy at once and so avoid missing the more serious condition. Finally, the importance of the routine examination of the urine in all abdominal cases should not be omitted; this will help in diagnosis and may prevent unfortunate mistakes. One has on several occasions seen a diagnosis of appendicitis made where subsequent urine examination revealed the presence of acetone and diacetic acid due to a condition of cyclic vomiting of childhood. In these patients there is frequently abdominal pain and vomiting with a rise in temperature. The child, however, lies dull and listless, whilst the smell of acetone may be detected in the breath. An anaesthetic in such cases is to be avoided. Pyelitis, due to infection of the kidney with the *Bacillus coli*, is also a disease which is extremely common in female children. There may be abdominal pain, vomiting and fever, but the temperature usually rises at the onset and there may be rigors, and in addition to abdominal tenderness there is often rigidity in the flanks. The condition is easily recognized by the turbid appearance of the urine, its smell, acid reaction, and the presence

probably caused an exaggeration of the condition, that surgical aid is sought. The indiscriminate administration of purgatives to children with abdominal symptoms is a practice strongly to be condemned. The uncertainty in diagnosis may sometimes be increased by the anatomical position in which the appendix may be found. In children it not infrequently occupies a position high up beneath the liver when the descent of the caecum to the iliac fossa has been arrested or delayed. Under such circumstances, when the organ becomes acutely inflamed, and involves the peritoneum on the under surface of the diaphragm, a diagnosis of pneumonia or pleurisy may be made, and this is further simulated by the dyspnoea which may be present. A correct interpretation of the symptoms, however, should not prove difficult as the temperature in chest conditions is usually higher, up to 103° or 104° , and the respiration rate is much increased, often up to 50 per minute, whilst the appearance of the child with flushed cheeks should suggest pneumonia. In appendicitis the pulse is rapid and the pulse-respiration ratio of pneumonia is not seen. Conversely, we have to avoid the mistake of diagnosing a basal pneumonia as acute appendicitis, for in both these conditions there may be vomiting at the onset, with a rise in temperature and tenderness referred to the right iliac fossa; but the absence of rigidity of the abdomen on palpation, the increased respiration rate and the presence of the early signs of consolidation in the chest are symptoms which should lead to a diagnosis of pneumonia. A careful examination of the chest in all doubtful conditions should always be made. In those cases where the appendix lies in the pelvis the abdominal symptoms are usually less well marked, and there is often absence of rigidity in the iliac fossa, the diagnosis being made upon definite tenderness of the appendix on rectal examination. Here,

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week following operation; adhesiolysis then becomes necessary, and if not delayed gives good results. The symptoms of this condition are colicky pains, vomiting, and absolute constipation with no passage of flatus, whilst visible peristalsis may be seen. The mortality rate for all cases of acute appendicitis operated on in the Manchester Children's Hospital during the past three years was 6 per cent. It is interesting to find that the disease is much more common amongst boys than girls.

When a child of any age complains of sudden abdominal pain, with vomiting and elevation of temperature, appendicitis must be thought of. Such symptoms associated with localized abdominal tenderness call for immediate operation whilst the inflammation is confined to the appendix. Operation at this stage is simple; drainage will often be avoided, and the mortality will be less than 2 per cent.

PNEUMOCOCCAL PERITONITIS.

This is one of the most serious emergencies which occur during childhood, and probably has the highest death-rate of all acute abdominal conditions. Fortunately it is not often met with. The disease occurs in two varieties: a primary type where the peritoneal involvement is the first sign of the infection, and a secondary type which follows a pneumococcal infection elsewhere in the body, either pneumonia or an infective joint lesion. Clinically the disease may be divided into two types, an acute and a chronic or localized variety, the former being the more usual and fatal form of infection. The primary type almost always occurs in girls of the poorer classes about 5 to 7 years of age, and is essentially associated with dirt and neglect, being rarely met with among the better classes. The onset is usually found as a pelvic infection with a rapid involvement of the general peritoneal cavity, producing a marked degree of septicaemia. In early cases, the location of the disease, with suprapubic pain, persistent vomiting, a

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of *Bacillus coli*, seen on the microscopic examination of a drop of urine.

The treatment of all cases of acute appendicitis is, of course, surgical, and should, whenever possible, be the removal of the appendix. In early cases, that is to say, within 48 hours of the onset and whilst the disease is confined to the appendix, operation should be carried out immediately, and the mortality at this stage should not be more than 2 per cent. Later than this, during the intermediate period, that is, from the third to the fifth day, when there is localized or diffuse peritonitis, the mortality rises sharply to about 10 per cent. During this period the patient's resistance is lowered owing to toxic absorption, and operation is always carried out at considerable risk.

The best guide to the child's state is the pulse-rate—as this increases in rapidity, so the seriousness of the condition increases also. At a later stage, when a localized abscess is present, operation can sometimes be postponed for two or three months till the abscess clears up, and the appendix then removed as a clean operation under the most favourable conditions. As to the technique of the operation little need be said. Battle's incision to the outer side of the rectus muscle, with inward displacement of the muscle, is suitable for all cases. It affords excellent access and leaves no subsequent weakness of the abdominal wall. Drainage should be employed in all doubtful cases and is more often required in children than adults, as the peritoneum appears to absorb toxic exudate so rapidly in early life that, unless drainage is adopted, it may tend to a fatal result. Where troublesome vomiting occurs soon after operation, this is generally due to paralytic ileus, and gastric lavage if steadily persisted in will usually relieve the condition, enterostomy in these cases being rarely necessary. Adhesions sometimes give rise to trouble in the second and third

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rise of temperature to 102° or 103°, and frequently pain on micturition and diarrhoea may enable a correct diagnosis to be made. Diarrhoea is sometimes the first symptom in these cases. It is often difficult to distinguish the condition from acute appendicitis; but the sex of the child and the evidence of pelvic infection with early acute toxæmia and high temperature may help in the diagnosis.

The treatment is simple drainage of the abdominal cavity, carried out as rapidly as possible. The peculiarity of the disease in its primary form to attack females has been explained by MacCartney and Fraser, who believe that the infection reaches the peritoneal cavity through the patent vagina and fallopian tube. In a similar way tuberculous and gonococcal infection of the peritoneum may be set up in the female, and it is also suggested that the change in the reaction of the vaginal secretion from alkaline to acid after the seventh year, explains the greater incidence of the disease in early life.

When a girl under 7 years of age and of the poorer class is seized with sudden abdominal pain, starting low down with signs of pelvic irritation, vomiting and a high temperature, the case may possibly be one of pneumococcal peritonitis, and should receive immediate surgical assistance.

ACUTE INTESTINAL OBSTRUCTION.

In considering the most frequent causes of acute intestinal obstruction, it is a useful practice to divide life into three periods. The first occurs in infants under two years of age, and obstruction is then almost invariably—apart from some rare congenital defect—due to an intussusception. The second occurs during childhood and early adult life, when patients most commonly become obstructed as the result of adhesions following abdominal tuberculosis or old appendicular trouble. Again, in a few cases the condition may be

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congenital in origin, due to the involvement of a persistent Meckel's diverticulum. Finally, the third period is found in later life, where the most common intra-abdominal cause of obstruction is a malignant stricture of the colon on the left side. It will thus be apparent that in early life the small intestine is involved, whilst later in life it is usually the large intestine.

Children stand the effects of intestinal obstruction badly, and with increasing toxic absorption collapse is soon manifest; it is essential, therefore, to recognize these cases early so that relief may be afforded as soon as possible. In cases due to adhesions, the onset may be extremely insidious, and shock is sometimes markedly absent at first. Absolute constipation, which is not relieved by the turpentine enema, and failure of the passage of flatus, may be the only sign present at the onset; this, however, is in itself quite sufficient even in the absence of any other symptoms or physical signs. At this stage the temperature will be normal, the pulse-rate very slightly increased, and the abdominal wall appears flaccid and moves freely. It is only when the case progresses into the second stage that colicky pain, abdominal distension, peristalsis and vomiting appear, and then, though the diagnosis is established, the patient's chances of recovery after operation are considerably lessened.

The early recognition of these cases depends on the failure of the enema to produce a result, and surgical intervention at this stage, before the classical signs of obstruction have had time to appear, will be followed by recovery in a high percentage of cases. Not infrequently a history of attacks of abdominal pain, and, perhaps, incomplete obstruction, enable a diagnosis to be made before the obstruction becomes complete, and operation in this intermediate stage will give excellent results.

When a child is seen with complete constipation, severe

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difficult to arrive at a definite decision, but if this rule be adopted, the abdomen will seldom, if ever, be opened needlessly. A tumour is found in at least 75 per cent. of cases, and when this is palpated the diagnosis is no longer in doubt; sometimes this can be felt more readily with the aid of a finger in the rectum. In some cases, again usually of the enteric variety, a tumour is difficult to feel, as it may be concealed by coils of intestine or hidden under the costal margin, and under such conditions the diagnosis can only be made on the evidence of vomiting and collapse and the attacks of abdominal pain. When the diagnosis is uncertain, an enema will usually throw light on the condition, for if blood and mucus and no faecal matter are returned it is a clear case of intussusception. Rectal examination is easily tolerated in these cases, and may sometimes enable one to feel the apex of the intussusception; in colitis, however, this is strongly resented. The diagnosis from entero-colitis is usually not difficult, as, though there is the passage of blood, this is usually found associated with a liquid stool, and the vomiting and collapse are less pronounced than with intussusception. Henoch's purpura is a somewhat rare condition, but does occasionally give rise to difficulty in diagnosis. This disease usually occurs in boys above the age of two years. There may be an abdominal tumour with abdominal pain and passage of blood per rectum, and the presence of bleeding from the gums or into a joint and a purpuric rash may help to show the true nature of affairs.

The treatment of intussusception is entirely surgical, and any other method of reduction should never be attempted. An early diagnosis, and prompt surgical operation, will avoid many fatal results. With regard to the etiology of intussusception, little is really known, hence the term idiopathic often applied to it. Many theories have been put forward, but

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abdominal pain, and when a turpentine enema is returned clear with no passage of flatus, do not wait for other symptoms to develop, for operation at this stage will frequently be able to relieve the obstruction successfully.

INTUSSUSCEPTION.

Acute intussusception is, after appendicitis, one of the most common causes of abdominal crises met with in early childhood. The frequency of this condition is well shown in a recent series of figures collected from various large hospitals where it accounted for 40 per cent. of the total number of cases of acute obstruction at all ages, excluding strangulated hernia. It will, therefore, be obvious how important it is to recognize this condition. The features of the typical case are well known, and even though usually met with in children under 12 months of age—who cannot assist the physician—the condition is not difficult to recognize. Contrary to other types of intestinal obstruction, these patients are usually seen within the first 24 hours of the onset, owing to its sudden and acute nature, the earliest symptom being the passage of blood and mucus per rectum, which is certainly present in 90 per cent. of these cases, being absent only in the rare type of enteric intussusception. In addition, the child is seized with sudden and periodic attacks of abdominal pain and screaming, and rapidly shows signs of collapse, lying quietly in its cot between these attacks. Later on appear the classical signs of intestinal obstruction, vomiting becomes more pronounced, and acute distension and severe shock are evident.

It is almost certain that every child under two years of age who passes blood and mucus per rectum with no faecal matter should be regarded as a case of intussusception, unless some other condition can readily be found to account for it. It may sometimes be

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abdominal pain, and when a turpentine enema is returned clear with no passage of flatus, do not wait for other symptoms to develop, for operation at this stage will frequently be able to relieve the obstruction successfully.

INTUSSUSCEPTION.

Acute intussusception is, after appendicitis, one of the most common causes of abdominal crises met with in early childhood. The frequency of this condition is well shown in a recent series of figures collected from various large hospitals where it accounted for 40 per cent. of the total number of cases of acute obstruction at all ages, excluding strangulated hernia. It will, therefore, be obvious how important it is to recognize this condition. The features of the typical case are well known, and even though usually met with in children under 12 months of age—who cannot assist the physician—the condition is not difficult to recognize. Contrary to other types of intestinal obstruction, these patients are usually seen within the first 24 hours of the onset, owing to its sudden and acute nature, the earliest symptom being the passage of blood and mucus per rectum, which is certainly present in 90 per cent. of these cases, being absent only in the rare type of enteric intussusception. In addition, the child is seized with sudden and periodic attacks of abdominal pain and screaming, and rapidly shows signs of collapse, lying quietly in its cot between these attacks. Later on appear the classical signs of intestinal obstruction, vomiting becomes more pronounced, and acute distension and severe shock are evident.

It is almost certain that every child under two years of age who passes blood and mucus per rectum with no faecal matter should be regarded as a case of intussusception, unless some other condition can readily be found to account for it. It may sometimes be

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difficult to arrive at a definite decision, but if this rule be adopted, the abdomen will seldom, if ever, be opened needlessly. A tumour is found in at least 75 per cent. of cases, and when this is palpated the diagnosis is no longer in doubt; sometimes this can be felt more readily with the aid of a finger in the rectum. In some cases, again usually of the enteric variety, a tumour is difficult to feel, as it may be concealed by coils of intestine or hidden under the costal margin, and under such conditions the diagnosis can only be made on the evidence of vomiting and collapse and the attacks of abdominal pain. When the diagnosis is uncertain, an enema will usually throw light on the condition, for if blood and mucus and no faecal matter are returned it is a clear case of intussusception. Rectal examination is easily tolerated in these cases, and may sometimes enable one to feel the apex of the intussusception; in colitis, however, this is strongly resented. The diagnosis from entero-colitis is usually not difficult, as, though there is the passage of blood, this is usually found associated with a liquid stool, and the vomiting and collapse are less pronounced than with intussusception. Henoch's purpura is a somewhat rare condition, but does occasionally give rise to difficulty in diagnosis. This disease usually occurs in boys above the age of two years. There may be an abdominal tumour with abdominal pain and passage of blood per rectum, and the presence of bleeding from the gums or into a joint and a purpuric rash may help to show the true nature of affairs.

The treatment of intussusception is entirely surgical, and any other method of reduction should never be attempted. An early diagnosis, and prompt surgical operation, will avoid many fatal results. With regard to the etiology of intussusception, little is really known, hence the term *idiopathic* often applied to it. Many theories have been put forward, but

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none appears to fulfil all conditions. One almost constant feature in these cases is the presence of enlarged glands at the ileo-cæcal angle, and this leads one to consider whether they may not have some relation to the causation of intussusception. Removal of a gland for microscopical examination sheds no light on their presence. It is possible that the glands may set up some abnormal stimulus to the neuro-muscular mechanism controlling peristalsis in this region, leading to a spasm of the bowel which perhaps initiates an intussusception; or the gland may cause traction on the bowel when inflamed and so start the process. All these cases are necessarily associated with a loose attachment of the cæcum and ascending colon. The commonest type of intussusception appears to start in the lower end of the ileum, a few inches from the ileo-cæcal valve; this, after reaching the valve, often becomes the ileo-cæcal variety.

When a child, usually a boy, under two years of age, is seized with periodic spasms of abdominal pain, accompanied by crying and vomiting, and passes blood and mucus, an intussusception is probably the cause. If an enema is returned blood-stained, with no faecal matter, and a palpable tumour is discovered, the diagnosis is no longer in doubt.

CONGENITAL PYLORIC STENOSIS.

In view of the failure of medical treatment to relieve pyloric stenosis, this disease must now be included in the list of surgical emergencies of childhood. The condition appears to arise from a want of co-ordination of the involuntary nervous supply to the pyloric sphincter, which fails to relax. This leads to a great hypertrophy and overgrowth of the musculature at the pyloric end of the stomach and the pyloric canal becomes blocked. As a result, the food instead of passing from the stomach into the duodenum is forcibly vomited, and

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this is perhaps the most characteristic sign of the condition. The symptoms commonly appear about the second to fourth week of life, and the majority of cases are seen in boys. In addition to the vomiting, which contains no bile, there is constipation and progressive wasting. Waves of peristalsis may be seen passing across the stomach and the hypertrophied pylorus can in many cases be felt under the right rectus muscle, just above the umbilicus. The recognition of a palpable tumour is not possible in every case. The disease has to be diagnosed from pylorospasm, in which condition both vomiting and peristalsis are seen, but the symptoms are less well marked, there is no palpable tumour, and the wasting and vomiting are less typical.

As soon as a diagnosis is established, immediate operation to relieve the mechanical obstruction is the only treatment that need be considered. Rammstedt's operation, where the hypertrophied muscle is divided longitudinally, without opening the mucous membrane, is a simple procedure and restores the continuity of the alimentary canal. The mortality of this disease is now much reduced; after medical treatment it was 80 per cent. In a paper (*B.M.J.*, February 28, 1925) on this subject, published three years ago, the operative mortality was stated to be 30 per cent. Since that time, in a series of thirty-five cases, it has fallen to 14 per cent. This improvement is due to the fact that the condition is becoming more readily recognized and operation is carried out earlier. Breast-feeding is a great asset in the after-treatment of these cases, which show a rapid and permanent improvement after operation.

When a boy starts forcible vomiting about the third week of life, is constipated and wasting, and visible peristalsis is seen, pyloric stenosis is usually the cause—a palpable tumour confirms the diagnosis. Operation carried out with present-day technique is followed by excellent results.

Some Clinical Aspects of the Syphilimetric Method of Vernes.

By E. OFENHEIM, M.D., PH.D.

Bacteriologist and Director of the Venereal Department, St. John's Hospital, Lewisham.

HERE is nothing more disconcerting and puzzling for a patient under suspicion of having syphilis than to receive exactly opposite verdicts from different laboratories at which his blood has been tested. If such a dilemma is distressing to the patient it is most embarrassing to the attending medical man who has sent the blood for examination in order to confirm his diagnosis, and is apt not only to discredit the medical adviser, but to shatter the faith of the patient in medical science. Such disappointing results are not only due to a difference in method—although the many variations, alterations and modifications of the various tests may be a contributory cause—but are the necessary consequence of tests which are not and cannot be standardized, for the simple reason that none of the reagents and ingredients used is of an absolute standard. Even with exactly the same technique and with identical ingredients it is quite possible that two different operators may arrive at divergent results, as in all the usual complement deflection and flocculation tests a great deal is left to individual judgment, which opens the door to human error.

It was the aim of Vernes to find a method which leaves nothing to individual judgment and to evolve

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a process which is purely mechanical or, let us say, mathematical, and which, based on strictly scientific principles, should give absolutely identical results, independent of the individuality of the operator.¹

By introducing a photometric measurement of the flocculation produced in a colloid by the addition of human serum, and using reagents which are not only tested as to their relative and joint effects on each other—as in the complement deflection tests—but which must individually and independently of the test answer a fixed chemical and photometric standard, he has reached his goal. He supplanted the vague mathematical signs of – or + or multiples of the latter, which gave at best a very limited range of possible variations in the result of the tests, by definite figures of an unlimited variety, but with a clear, exact and invariable meaning. Only by these means the blood test has been put on an exact scientific basis, and gives us the possibility of drawing a chart similar to a temperature chart, indicating the intensity of the disease at any given moment.

It is not the object of this article to go into the theory of the syphilimetric test, which has been published elsewhere,² but to show how the clinical aspect and the treatment of syphilis may be influenced by the control of this test.

Before entering into this matter it may be advisable to recall briefly the meaning of the figures of optic density which are obtained by Vernes' photometer. Normal serum might give an O.D. from 0 to 4, but at 4 or above, the serum is, with very few exceptions, definitely syphilitic. Based on a perfectly amazing amount of material, and very accurately kept statistics, Vernes has found that an O.D. up to 6 occurred only once in 500 normal bloods; an O.D. between 7 and 11 occurred once in 2,000 normal cases; an O.D. between 12 and 18 occurred once in 10,000 normal cases; whilst

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he has observed an O.D. of 27 only once in an *apparently* normal individual in 650,000 cases, which means that the chances of an individual giving an O.D. up to 27 not being syphilitic are 1 to 649,999, which is surely negligible. Having practised Vernes' method myself for three years, and having done several thousand blood tests, I have not yet once found a definitely normal serum giving an O.D. of more than 5, so that for all practical purposes one can say that a serum giving an O.D. between 0 and 3 is definitely normal; between 3 and 5 doubtful; from 5 to 27, with exceedingly rare exceptions, syphilitic; over 27, *without exception*, syphilitic.

In reading a syphilimetric chart we must bear in mind what Vernes constantly tries to impress, i.e. that the blood reactions in the syphilitic vary considerably—in a similar way as the temperature varies in a febrile patient. The morning temperature of a patient suffering from some severe septic infection may be normal, whilst it may be very high in the evening. In a similar way the O.D. of a syphilitic patient may be low (although practically never right down to normal) at one time, whilst it may be very high at another time, especially if the patient is under treatment. It is therefore essential in a doubtful case giving a low O.D. not to depend on a single test but to repeat the test several times at intervals. On the other hand a single high reading is definite as to the presence of the disease. In untreated cases one obtains, as a rule, a fairly high reading and—another advantage over other tests—this high reading is obtained at a much earlier stage than with any other test—generally within six to eight days after the appearance of the primary chancre.

The greatest advantage of the syphilimetric method over all the others lies not in its diagnostic value but in the control of the treatment, a control which is

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quite impossible by any other method. If a syphilitic patient is submitted to a course of intravenous injections with any of the arsenical preparations generally used and the blood is submitted to repeated examinations by the Wassermann or any of the flocculation tests, the results will for a long time be a monotonous + + + or + + with an occasional + thrown in, and we are working in the dark not knowing whether our treatment is beneficial or not, since it is generally recognized that the disappearance of overt symptoms and lesions is in no way an indication of a diminution of the disease. How frequently do we find that with the disappearance of all external manifestations, a recrudescence takes place showing itself not only serologically but in its slow and pernicious effects on internal organs—chiefly the cerebrospinal system. Metaphorically speaking, one can compare the spirochæte to a wild animal which, pursued, hides itself in its lair and effaces its tracks in order to throw its enemies off the scent and to make them believe that it has vanished.

Not so with Vernes' test. Here we can definitely and accurately say whether the blood reaction, and incidentally the disease in the patient, is diminishing or increasing in intensity. If our treatment is efficient we will see a gradual drop of the curve on our chart, just as the temperature curve in a patient goes down gradually as he is improving. We can also see if a recrudescence is taking place by a sudden rise of our syphilitic curve.

The clinical experience that some patients react more favourably to bismuth or mercury than to arsenic, or the reverse, can be graphically shown by continued blood tests. I have had quite a number of cases under my own care in which I found that in spite of a series of arsenical injections, the O.D. remained at a level between 100 and 80 with very slight variations, being apparently in no way influenced by the treatment;

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of the cerebrospinal fluid is fully confirmed by the syphilimetric test. On the one hand, we may get a high reaction of the serum and a permanently normal reaction of the C.S.F. On the other hand, Vernes has published quite a number of charts which show exactly the reverse, i.e. that after some treatment the O.D. of the blood serum drops to normal and remains at normal, which, of course, may induce the medical man in attendance to declare his patient as cured, whilst the syphilimetric reaction of the C.S.F. remains high, and continued treatment would be indicated. Those are the cases in which not infrequently disappointments occur in patients who, having had negative Wassermann results—or also Vernes tests—for quite a considerable time, suddenly develop symptoms in the central nervous system. Vernes therefore invariably insists on repeated tests of the C.S.F., which are not limited to the photometric examination of its flocculation power, but also comprise a leucocytic count and the estimation of albumen. He has shown that an increase of leucocytes over 2 per cubic mm. and a content of more than 0·2 per cent. of albumen are generally the first symptoms of a meningeal irritation, which appears some time before any hyperflocculation can be demonstrated. He is, of course, fully cognizant of the fact that in certain individuals a slightly increased leucocytosis and more often a larger amount of albumen may be physiological (especially in patients with high blood-pressure), but in the vast majority of cases such abnormalities in the C.S.F. should put one on one's guard and should be an indication to be on the look-out for subsequent changes in the O.D. Persistently increased leucocytosis and albumen without raised O.D. therefore do not constitute by themselves definite symptoms of a cerebrospinal infection, unless they show changes after continued treatment, or are concurrent with or followed by a high O.D.⁴ The leucocytic count can be done in the ordinary way or

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changing the treatment over to bismuth there was within a few weeks a gradual drop of the O.D. down to 30 or 20 or even lower; turning the patient on to mercury it sometimes happened that a new rise in the O.D. took place, which showed that the exhibition of this drug had not the desired effect. This is only given here as an example, as of course all sorts of variations may take place, but whatever happens we can see clearly what the effect of our treatment is.

By means of this control Vernes was able to show that short treatments with arsenical intravenous injections given at long intervals have not only no beneficial effect, but on the contrary act like a whip on the disease, and that a drop in the O.D. which may occur after a short course of injections is soon followed by a further and sometimes even higher rise when the treatment is interrupted.³

He has shown in a large number of cases that it is just those patients who have had short and intermittent treatment who are most likely to develop late syphilitic lesions, and particularly affections of the cerebrospinal system, like locomotor ataxy and G.P.I. This is a point where the syphilimetric method throws a new light on one of the most obscure fields of syphilatology. Vernes makes it a rule in all cases to submit their cerebrospinal fluid as well as their blood to the syphilimetric test, and with the large material at his disposal he has arrived at very curious results. In opposition to the generally accepted theory that the cerebrospinal infection is a lesion which develops only in the later stages, he found that the C.S.F. in some cases gives a high reaction as early as four or six weeks after the appearance of secondary symptoms, which emphasizes the importance of early, vigorous and continued treatment.

The general experience that the reaction of the blood is by no means an indication of the condition

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blood and C.S.F. reactions are sufficient ground to declare a cure, is based on his vast clinical experience and on nearly 100,000 records which are kept at the Institut Prophylactique. He has, of course, continued the blood control on a large number of patients far beyond the prescribed eight months, but he has never yet seen a recurrence in any patient who has given a normal reaction for eight months, although his observations extend over fourteen years. On the other hand he has had a large number of patients who, after having been declared cured, have produced normal healthy children, and he has even had some patients who have contracted a fresh primary sore, which is perhaps the strongest of all possible proofs of a complete cure.

A large number of comparative series has been carried out between Vernes' and other blood tests—the most extensive one by Vernes himself in collaboration with Badoux and Mlle. Narbel,⁷ and I have myself tested a series of over 200 sera, which were simultaneously submitted to two different Wassermann tests and to the Σ test by other independent workers. Whilst on the whole the majority of the tests were in agreement, the number of discrepancies was fairly evenly distributed between the various methods. In my opinion such comparative series of tests are quite valueless, as nobody is able to decide in the cases of disagreement which method is right and which is wrong, and only the observation of a large clinical material over a number of years—as it is at the disposal of Vernes—could give a verdict in favour of one or the other method. It is of much greater importance that there is practically never any discrepancy in the results of the Vernes tests when carried out by different workers; a proof of its uniformity and its standardization in contraposition to other tests of which one might be justified in saying with some exaggeration: *Quot capita*

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with Vernes' counting chamber, whilst the amount of albumen can be very accurately estimated by a simple photometric method.⁵

Under appropriate treatment it is generally found that it is the leucocytosis which is the first to return to the normal, followed in 50 per cent. of the cases by the content of albumen, and in the remaining 50 per cent. by the O.D.⁶ The exact control by the syphilitic method has proved that active or latent cerebro-spinal lesions do not respond well, as a rule, to arsenical treatment, but are much more amenable to bismuth and especially to prolonged mercurial administration. In some cases the combined exhibition of tryparsamide and salicylate of mercury seems to have been particularly successful.

The question has been raised how and by what means it was ascertained that the height of the O.D. corresponds to the intensity of the disease. This could only be proved by the constant comparison and observation of clinical symptoms with the blood control, but it was invariably found that the more severe, the more extensive the lesions were, the higher was the O.D. It was further seen that with active and efficient treatment the O.D. dropped *pari passu* with the clinical improvement of the patient. In my own experience I have never yet found a case in which the clinical symptoms became worse and the O.D. of the serum dropped at the same time. On the other hand, the visible symptoms may disappear without the blood showing much variation, but this only proves that in these cases the syphilis is still present in full force and that all evident manifestations have temporarily subsided; the spirochaete is only for the moment cowed by the blows struck at it by the treatment, ready at any moment to make a fresh charge on its defenceless victim if the barrage should be relaxed.

Vernes' statement that eight months of normal

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tot sententiae.

CONCLUSIONS.

The object of the foregoing is to show that:—

(1) The Vernes' blood test is the only one which is uniformly standardized and is therefore bound to give identical results by whomsoever it is done.

(2) The syphilimetric method by virtue of its accurate mathematical basis permits a complete and critical control of the treatment inasmuch as it expresses in figures the intensity of the disease present—whether active or latent—but it has to be borne in mind that the O.D. has no relation to the *localization* of the lesions on which the prognosis *quoad vitam* or *ad restitutionem ad integrum* chiefly depends.

(3) The possibility of mathematical measurement of the intensity of the disease at any given moment, together with clinical observations and with therapeutic experiments, opens up a wide vista as to further researches.

(4) By Vernes' blood test, in combination with the prescribed examinations of the cerebrospinal fluid, much more definite and reliable information as to an effected complete cure can be obtained than by any other method.

References.

¹ For technique see "The Vernes Flocculation Test as an accessory Serologic Guide in the Combat against Syphilis," by A. B. Baylis, A. E. Sheplar, and J. MacNeal (*American Journal of Syphilis*, 1926, vol. 10, p. 298).

² See the author's article on "The Syphilimetric Method of Vernes" in *The Journal of Clinical Research*, vol. xiv, no. 1, January, 1928.

³ See Vernes, "Une Sérologie précise éclaire le traitement de la Syphilis," Fascicule 5.

⁴ A. Vernes, "L'organisation de la Syphilimétrie" (*Travaux et Publications de l'Institut Prophylactique*, 1923, p: 30).

⁵ Loc. cit. p. 68.

⁶ Loc. cit. p. 34.

⁷ Vernes, "La portée sociale de la mesure de l'infection syphilitique," 1924, p. 19.

The Early Treatment of Puerperal Sepsis.

By J. N. DOUGLAS SMITH, M.B., CH.B.

Obstetrical Consultant to the Cumberland and Westmorland County Councils; late Senior Resident Medical Officer, Queen Charlotte's Hospital, etc.

ALTHOUGH the puerperal pyrexia regulations have been received with a feeling of resentment by many practitioners, they mark an interesting step in the progress of midwifery. It is now possible for any doctor in England, no matter how poor his patient, to call in a second opinion, and to hand over some of the responsibility for the greatest worry of general practice—the septic maternity case.

Unfortunately, not every practitioner has a clear understanding of how much can be done with advantage both before and immediately after the onset of the disease. In the first place, there are many who are still unable, for one reason or another, to take the first precaution against puerperal sepsis, namely, adequate ante-natal care. The importance of this is now recognized, even by many of those who do not practise it; but it is difficult to foresee any scheme which is practicable at the present time to enable all patients to obtain this supervision. Increased attention to the teaching of ante-natal treatment in the medical schools may lead to the earlier discovery of some of the more obvious cases of pelvic deformity; but even assuming the earnest desire of every student to understand fully the latest advance in preventive midwifery, it is certain that in many busy practices and in districts where the home conditions are unsuitable for a thorough examination, many a patient, as at present, will go

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into labour at full-time or at some later date without ever having had her pelvis examined during her pregnancy.

Ante-natal Supervision.—The establishment of ante-natal centres in every town has been suggested as a solution. Some authorities have even prophesied such a radical change as a midwifery service in which, as a general rule, all normal confinements will be attended by midwives, while the doctor will be required only in abnormal cases. It is a matter of opinion how many doctors would face with composure the prospect of their midwifery practices consisting solely of complicated confinements, but there can be little doubt that it is the very reasonable fear of having their normal cases taken over by midwives which prevents many doctors from making use of the ante-natal clinics which already exist.

Practically every practitioner can cite cases where patients have made uneventful recoveries when least expected; but it is generally agreed that the greater the amount of manipulation at the confinement, the greater is the risk of the introduction of septic organisms, and also that no woman who has been through a long, complicated, exhausting labour is in the best condition to withstand sepsis if it should arise in the puerperium.

Conservative Treatment.—Once the patient's temperature has risen, as a rule on the second or third day after the confinement, regrets about ante-natal supervision or methods of delivery are useless. It is a comfort for the doctor to realize that the vast majority of cases of puerperal sepsis are not cases of generalized infection, but of intra-uterine sepsis, due to one or more small pieces of membrane or blood-clot which have been left in the uterus and have become infected; that the condition is a localized one, and is likely to remain localized if properly treated; that the rise in the temperature is due to the toxins of the intra-uterine organisms entering the blood-stream, not the organisms

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themselves; and that the natural tendency of the fragments in the uterus is to disintegrate or liquefy and to pass out in the lochia, if the drainage of the uterus is sufficiently good.

Although nearly a century has passed since the importance of thorough drainage was first pointed out, it is only in comparatively recent times that it has been adopted as routine treatment. The methods which were generally in vogue in maternity hospitals a few years ago consisted in propping up the patient in bed—in a comfortable position, but propped up—so that the uterus might drain easily, in giving ergot three times a day with the idea of stimulating the uterus, and in ensuring that the patient's bowels moved freely at least once a day in order to remove the toxins from her blood. The recent confirmation of the suspicion that liquid extract of ergot B.P. does not contain sufficient active principles to have any effect on the puerperal uterus has led to the substitution of hot vaginal douches for the stimulation of the uterus, but it has done nothing to upset the general line of treatment. On the contrary, that discovery has made it evident that in many cases of puerperal sepsis all that is required to effect a cure is the propping up of the patient and a daily bowel motion.

The ease with which these two elementary precautions can be overlooked in the stress of the moment, and the startling results of their omission, raise the question whether, among those patients who have been certified as having died of puerperal septicæmia, there may not have been some who were simply allowed to weaken to death from high temperatures caused by uterine and intestinal toxins, without any septicæmia from start to finish.

It is sometimes suggested that if the onset of the temperature is rapid, or if the temperature rises above a certain height, or if it remains above a certain

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height for a definite number of hours, it is an indication that the uterus should be explored and cleared out. Most of those who hold that view, however, admit that, other things being equal, the longer exploration of the uterus can be deferred the better. Even where there is subinvolution, the venous sinuses, which are the main paths for infection, are closing up; and the less vascular the uterus, the less chance is there of starting a generalized infection.

Case 1.—A striking case recently came under my notice when, on the evening of the second day of the puerperium, a patient with scanty offensive lochia and subinvolution of the uterus was found to be running a temperature of 104 deg. During the following thirty-six hours the temperature never fell below 102 deg. When, at the end of that time, the patient was propped up, the fall of the temperature was slow owing to the difficulty which the doctor had in overcoming the patient's personal idiosyncrasies and habitual constipation. But as soon as her bowels moved freely, four days after she was propped up, the temperature fell rapidly from above 99 deg. to 98 deg., and that was the end of that condition.

In this case a favourable prognosis was strengthened by the appearance and appetite of the patient—two important points which ought to be considered before any decision is arrived at as to the diagnosis and treatment of a case of puerperal pyrexia.

Every practitioner who has tried conservative treatment has met with similar cases. It seems very doubtful whether it is possible for anyone to have a real working rule about the rapidity of the onset, or the height, or the duration of the temperature. Probably a safer rule to follow is that no doctor is justified in exploring the uterus, or in embarking on drastic and possibly dangerous methods of treatment in one of these doubtful cases, until the probability of a localized infection and the probability of a natural cure have been eliminated. And they can only be eliminated by propping up the patient, stimulating the uterus, and getting, and keeping, the bowels well open.

Curettage.—One of the great changes in midwifery is the entire suppression of curettage in the treatment of puerperal sepsis. Curettage, for so long a routine treatment, is now condemned as dangerous in every puerperal case from a septic abortion to a generalized streptococcal infection. Although it still lingers on in a few isolated places where modern midwifery methods are either unknown or taboo, practically the whole medical profession now realizes the risks of spreading or aggravating infection which have been run in the past, and the importance of gentle manipulation in those rare cases where a gloved finger has to be employed for the removal of adherent fragments. Probably the reason why curettage has continued in spite of the spread of bacteriological teaching is because of its apparent success in some cases where the trouble was not in the uterus, or where the virulence of the infecting organisms was so low that the patient's powers of resistance enabled her to withstand the effects of the unnecessary operation.

Intra-uterine Douching.—The fear of disseminating infection has also affected the popularity of intra-uterine douching. Now there is a great divergence of opinion as to the cases in which an intra-uterine douche may be useful, but it is safe to say that the days of routine, frequent, intra-uterine douches, as given in the past, are over. Modern experience has shown both that the power of the uterus to expel the products of conception is much greater than it was given credit for, and that for the stimulation of the uterus, hot vaginal douches of a low power will do all that is necessary without any of the dangers of the older method.

Those who still believe in clearing out the uterus generally advocate one intra-uterine douche immediately after the operation in order to remove any debris, to be followed by vaginal douching only. But

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PUERPERAL SEPSIS

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in some cases, where the temperature persists, it has been found that there is an accumulation of pus which fails to find an outlet. In those cases some authorities believe in an ordinary intra-uterine douche, while others prefer the glycerine irrigation which is associated with the name of Remington Hobbs. One advantage of the latter method is that not only does it wash out the cavity of the uterus, but it also sets up the drainage of lymph from the congested and, in some cases, infected uterine wall.

Anti-streptococcal Serum.—The chief effect of anti-streptococcal serum in the early treatment of a septic case is waste of time. It is certain that vast quantities of serum have been administered promiscuously in cases for which it is useless, and that the temporary fall and subsequent rise in the temperature have merely obscured the real cause of the trouble. The only time when anti-streptococcal serum may possibly be given with advantage to a patient suffering from an intra-uterine infection is in a case where there is good reason for fearing the worst. But in that case it is well for the doctor to realize that the serum has been given solely as a prophylactic against a possible generalized blood infection in the future, not as a treatment of the localized intra-uterine infection in the present.

The only other point which need be mentioned is that when anti-streptococcal serum is required it should be given in large doses. This applies whether it is given alone, as in the older treatment, or, as in the more modern, in conjunction with a drug, such as quinine bi-hydrochloride. In either case, doses of from 30 c.cm. to 50 c.cm. are generally given. Where a patient responds, or appears to respond, permanently to a much smaller dose, such as 10 c.cm., it is extremely doubtful whether there was any call for the use of anti-streptococcal serum.

Retained Piece of Placenta.—Probably the principal

PUERPERAL SEPSIS

reason for much of the drastic treatment of the past has been the fear of a piece of retained placenta. Now it is generally recognized that it is quite a rare condition, and that in any case of infection after a full-time labour the probability is against the presence of a placental fragment. Recently I have seen, at one stage or another, three cases where a piece of placenta was left in the uterus.

Case 2.—This was a case of obstructed labour where a still-born baby was delivered after the head had been impacted for several hours in the pelvis. Twenty minutes after the delivery the placenta was expelled very easily without being expressed. On the second day the lochia was offensive, and the patient passed a large blood-clot. With the exception of that day, the lochia was normal throughout the puerperium. On the fourth day the patient had four haemorrhages at intervals of about two hours. On examining the clots passed during the last haemorrhage I found a piece of placenta measuring roughly three by two inches—almost certainly a placenta succenturiata—which must have been detached during the efforts made to cause contraction of the relaxed uterus by abdominal massage and by the subcutaneous injection of an ergot preparation. After the expulsion of this fragment the patient ran a temperature for some days owing to cystitis—a common sequel to prolonged pressure on the bladder and urethra—but that condition cleared up under treatment, and she made a complete recovery.

Case 3.—This was a case where twins were delivered, and the placenta was expressed with difficulty. In the first few days of the puerperium there were two sharp rises of temperature, which were attributed to breast engorgement and headaches. During the night of the seventh day haemorrhage began, and continued at intervals in small quantities until two small pieces of placenta were removed the following night. Evidently some infection was introduced from the vagina or cervix, for on the third day after the exploration the temperature rose to 105 deg., and for the first time in the puerperium the lochia was offensive. The condition was treated with hot vaginal douches and subsided rapidly.

Case 4.—In this case, after twins were delivered, the patient suffered from severe post-partum haemorrhage and collapse, and the doctor removed the placenta manually. The puerperium proceeded normally till the seventh day when the temperature began to rise and an offensive purulent discharge developed. Thorough drainage of the uterus was maintained by propping up the patient, but the discharge increased in quantity and offensiveness till the tenth day. Then something which the nurse described as being “like a very offensive piece of blood-clot” was

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in some cases, where the temperature persists, it has been found that there is an accumulation of pus which fails to find an outlet. In those cases some authorities believe in an ordinary intra-uterine douche, while others prefer the glycerine irrigation which is associated with the name of Remington Hobbs. One advantage of the latter method is that not only does it wash out the cavity of the uterus, but it also sets up the drainage of lymph from the congested and, in some cases, infected uterine wall.

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Felixstowe as a Health Resort.

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Up to ten years ago seaside towns were boomed for the ozone in the air. Today no one thinks of ozone, for science has shown that the sun, with its ultra-violet rays, is the giver of health and of life. It is therefore imperative that a town such as Felixstowe, which claims, and rightly claims, to be an ideal health resort as well as a residential town, should be able to show a first-class sunshine record.

12 Months.				6 Winter Months.				Average Yearly Totals for 1920-1926.	
Town	Hours of bright sun-shine.	No. of rainy days, 0·01 in. or more.	Inches of rainfall.	Hours of bright sun-shine.	Inches of rainfall.	No. of rainy days, 0·01 in. or more.	Hours of bright sun-shine.	Inches of rainfall.	
Falmouth	1,705	192	37·24	491	23·34	97	1,691	44·52	
Torquay	1,699	173	31·76	454	22·94	112	1,762	33·82	
Southsea	1,688	160	26·41	436	16·57	91	Not complete		
Worthing	1,678	160	23·57	502	17·16	85	1,824	27·43	
Eastbourne	1,659	159	31·98	488	18·52	159	1,828	30·01	
Margate	1,654	148	21·86	473	11·60	79	Not complete		
Walton-on-Naze	1,642	126	18·66	489	10·01	67	Not complete		
FELIXSTOWE	1,637	159	19·39	486	10·17	83	1,782	21·21	
Ventnor	1,634	173	31·85	497	19·58	93	1,718	31·00	
Lowestoft	1,623	175	22·03	484	10·39	92	Not complete		

The above figures show that Felixstowe held the eighth place in 1926 in all England for sunshine, having only sixty-eight hours less than the first town; but whilst Felixstowe had only 19·39 in. of rainfall, Falmouth, the first town, had 37·24 in. If the averages are taken over a period of seven years Felixstowe is third in all England, and its rainfall is 21·21 in. as against Eastbourne's 30·01 in. No other town with

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expelled after an intra-uterine douche. The next day the discharge was still very profuse and rather offensive, but it was evident from the patient's condition that she was not suffering much from toxæmia. It was considered that under the circumstances exploration might prove to be unnecessary, and in the presence of pus would certainly be dangerous, so it was decided—very fortunately, as it proved—to try conservative treatment for some days longer.

The chief points illustrated in these cases may be summarized briefly as follows : As guides to the presence or absence of a placental fragment, the temperature, pulse and lochia are quite unreliable. The two definite signs of a piece of placenta are haemorrhage and profuse purulent discharge. Even then, in the former case, the possibility of a fibroid or of a cervical laceration, and in the latter of a large adherent piece of membrane, must be excluded. In a case of haemorrhage there is danger in delay; in a case of discharge, which may respond to conservative methods, there is danger in hasty exploration. In any case, whether exploration is necessary or unnecessary, there is danger of introducing or spreading infection. A rise or a continuation of the temperature may be due to some condition outside the uterus. The toxic effects of a purulent discharge may be minimized by postural treatment.

Within the past few years, great changes have taken place with regard to the treatment of the septic case. The old method of immediate and ruthless interference was first definitely discarded. Then followed a period of uncertainty, when the chief aim seemed to be a policy of masterly inactivity, which continued until it became clear that it could easily degenerate into an inactivity which was anything but masterly. Now it is being realized more and more that in the early treatment of puerperal sepsis, except in a small number of cases which will admit of no delay, probably the safest course to pursue is to give Nature a chance—under strict supervision.

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such a sunshine record has such a low rainfall record. It is therefore evident that every hour of sunshine can be enjoyed to the full in the open air. The health records prove the full value of Felixstowe's sunshine combined with its low rainfall. The death-rate is smaller than that of the whole country, in spite of the fact that many people retire to Felixstowe to spend their old age there. In the same way the incidence of phthisis and other infectious diseases is much smaller than that of the whole country.

The gardens also abundantly prove this, for many plants grow there which refuse to grow in the open air in any other part of the country but Cornwall. A visit paid to the Cliff garden, of which the town is rightly proud, or to many private gardens, proves the truth of this contention. The fact that the subsoil of Felixstowe is of crag adds to the dryness of the soil and air; a few minutes after the heaviest downpour, the ground is quite dry. Patients suffering from rheumatism and phthisis, because of the dryness, do extremely well in Felixstowe; convalescents from all diseases or operations rapidly recover their health in its dry and bracing atmosphere. Delicate children recover their health at a very rapid rate; the thinnest and palest soon become pink, muscular, and bonny. This has led to the establishment of many schools here during the last few years. It is due to the fact that Felixstowe faces south, but is on the East Coast, that the sunshine of the South Coast is combined with the bracing climate of the east; and it is due to the combination of a record sunshine, a low rainfall, and a bracing climate that the health record of Felixstowe is one of which any town should be proud.

Practical Notes.

The Treatment of Cancer of the Larynx.

L. Colledge is of opinion that laryngectomy for cancer of the larynx in properly selected cases is justified by its results both immediate and remote, though it is too often declined. At the present time the operation is almost limited to cases of intrinsic cancer too advanced for any conservative operation—that is, laryngo-fissure or partial excision. In such cases the pharynx is not invaded and only so much of it need be removed as is necessary anatomically for the excision of the larynx; its closure presents no serious difficulties and there is usually no need for a plastic operation nor the use of skin flaps. Many lasting cures, says Mr. Colledge, can be claimed. If an operation is feasible, Mr. Colledge states that he has still to be convinced that there is any satisfactory alternative as a routine treatment. He has seen no good come from the use of X-rays; and of the patients treated with lead, only one showed any success. Mr. Colledge's experience of radium has been small, but unsatisfactory, the treatment leading to necrosis of cartilage without eliminating the growth. It may be, however, that the use of small doses in needles over prolonged periods will give better results in the future.—(*Journal of Laryngology and Otology*, March, 1928, p. 161.)

G. Tucker states that adequate surgical removal is the only treatment worthy of consideration with the hope of cure of cancer of the larynx. The removal of an intrinsic growth by intralaryngeal surgery is not advisable because of the uncertainty of complete removal. After early diagnosis, laryngo-fissure will cure 80 per cent. of the anterior intrinsic cases and will give an adequate voice, with no operative mortality, without a mutilating operation. Recurrences are always amenable to complete laryngectomy if the patient has been kept under post-operative observation. Complete laryngectomy, according to MacKenty, should be done in all intrinsic cases in which there is extensive involvement. The use of radium and X-rays, says Dr. Tucker, is now generally conceded to have no place in the treatment of cancer of the larynx, except in some cases as post-operative radiation after laryngo-fissure or laryngectomy to prevent glandular invasion. It may be used also in those cases of cancer of the larynx which are not amenable to surgery because of the location or extent of the growth. Tracheotomy, for the relief of dyspnoea, with palliative radiation, may be advisable for advanced cases.—(*Surgery, Gynecology and Obstetrics*, March, 1928, p. 303.)

Separation of the Symphysis Pubis during Labour.

W. Brehm and H. V. Weirauk suggest that separation of the symphysis pubis occurs during delivery more frequently than was

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formerly believed. X-ray examination should be used as an adjunct in the determination of any suspicious disproportion between passage and passenger. A separation of 0·9 cm. or less will not cause symptoms; a separation of more than 0·9 cm. will produce symptoms to which careful attention must be accorded. The surgeon must be ready for any emergency in case the foetus shows signs of distress; he should be sure that the bladder and rectum are empty before the head passes through the outlet. After delivery the entire pelvis should be strapped and a pelvic swathe applied, which should be worn for at least three months.—(*American Journal of Obstetrics and Gynecology*, February 1928, p. 187.)

The Treatment of Asthma with Adrenaline.

M. Sébillot observes that although adrenaline often soothes the crisis in true asthma, yet its abuse is to be feared and its disadvantages are many. Patients get accustomed to its use as they do to morphia. It may be administered by the mouth, subcutaneously, by way of the bronchial tubes, or by the nasal route. When given by the mouth, 20 minimis of the 1 in 1,000 solution is the maximum dose; subcutaneously, half a milligram may be given and repeated in an hour; by the nose, a nasal spray of the 1 in 1,000 solution may be used, not more than 1 c.cm. at a time. The following prescription may be found useful in relieving an attack of asthma or spasmodic coryza :

R	Adrenaline (1-1,000 sol.)	-	-	-	g. 7·5 (5ii)
	Physiological saline	-	-	-	g. 7·5 (5ii)
	Stovaine	-	-	-	g. 0·15 (grs. ii)

Or the following :

R	Cocaine hydrochlor.	-	-	-	g. 0·02 (grs. $\frac{1}{10}$)
	Atropine sulphate	-	-	-	g. 0·005 (grs. $\frac{1}{10}$)
	Adrenaline (1-1,000 sol.)	-	-	-	10 c.cm. (5iiss)

The above may be applied to the nose by a cotton-wool tampon or by using a spray.—(*Journal des Praticiens*, March 17, 1928, p. 169.)

The Treatment of Puerperal Sepsis by Hysterectomy.

B. Solomons points out that the field for the performance of hysterectomy in sepsis is limited. In an effort to formulate a plan for estimating the indications for hysterectomy, it seems to be a thing easier to say than to do. If hysterectomy were done as a routine, the percentage mortality would probably be small, but many uteri would be sacrificed unnecessarily; when the operation is done too late the results are fatal. How, then, can the *dies optima* be decided upon? The following symptoms and signs may be regarded as cardinal: The temperature and pulse-rate continue to be raised in spite of treatment; involution is arrested; subinvolution is accompanied by nodules or irregularities on the surface, which are pathognomonic of abscess formation or necrosis; in addition, a stinking discharge is present. A blood infection is a definite contra-indication to hysterectomy. Dr. Solomons gives details of two cases of puerperal sepsis treated by hysterectomy;

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one case proved fatal in spite of operation, but in this case success would doubtless have been obtained had operation been done some days earlier.—(*Proceedings of Royal Society of Medicine*, April 1928, p. 1063.)

The Paraffin Treatment of Painful Rheumatic Joints.

O. Vontz considers that the paraffin method is a valuable addition to physico-therapy in painful chronic rheumatic joint conditions. By virtue of its physical properties of being a bad conductor of heat, having a high boiling point, and being absolutely free from water, paraffin is, claims Dr. Vontz, an ideal substance with which to apply heat to the skin. It produces no irritation of the superficial cutaneous nerves, and can therefore be tolerated at a very high temperature without any discomfort, whilst being such a bad conductor of heat a long-continued deep hyperæmia is induced. As used by Dr. Vontz, the method consists in applying melted paraffin at a temperature of 80–85 C. to the affected limb which has previously been rendered hairless. A thin layer of paraffin is first put on quickly to envelop the limb completely, and then more is added until the layer is 1 to 2 cm. thick; finally, a flannel bandage is put on the limb. The paraffin is left on for about five hours. No pain is experienced when it is taken off, and no ill-effects have been seen on the skins of the many patients treated in this way. The method has been as successful in the hands of Dr. Vontz as the more lengthy and expensive methods of hydrotherapy hitherto used in the treatment of painful rheumatic joints.—(*Münchener Medizinische Wochenschrift*, March 16, 1928, p. 478.)

The Treatment of Catarrhal Conjunctivitis.

W. Brinitzer has found the following eye lotion of great value in the treatment of all forms of catarrhal conjunctivitis. It has also the great advantage that it can safely be given to the patient himself with instructions to drop a few drops in with a small pipette at frequent intervals.

R Zinc sulph.	-	-	-	-	-	g. 0·02 (grs. $\frac{1}{5}$)
Alumen	-	-	-	-	-	g. 0·05 (grs. $\frac{1}{2}$)
Suprarenin. hydr.	-	-	-	-	-	g. 0·0004 (grs. $\frac{1}{500}$)
Hydrarg. bichl.	-	-	-	-	-	g. 0·001 (grs. $\frac{1}{50}$)
Acid. bor. 3 per cent. sol.	-	-	-	-	-	ad 10·0 c.cm. (5iiss)

This lotion was used on 100 cases of various forms of catarrhal conjunctivitis, and in all except one there was an almost immediate cessation of the pain and stinging in the eyes, followed by a rapid disappearance of the swelling and redness of the conjunctiva. The excessive secretion was the last symptom to disappear, but this dried up almost completely within a few days.—(*Medizinische Klinik*, March 30, 1928, p. 499.)

The Etiology and Treatment of Hiccough.

H. Lichtenstern draws attention to the similarity between the respiratory disturbances in an attack of asthma and one of hiccough. In

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R	Adrenaline (1-1,000 sol.)	-	-	-	g. 7·5 (5ii)
	Physiological saline	-	-	-	g. 7·5 (5ii)
	Stovaine	-	-	-	g. 0·15 (grs. ii)

Or the following :

R	Cocaine hydrochlor.	-	-	-	g. 0·02 (grs. $\frac{1}{10}$)
	Atropine sulphate	-	-	-	g. 0·005 (grs. $\frac{1}{20}$)
	Adrenaline (1-1,000 sol.)	-	-	-	10 c.cm. (3iuss)

The above may be applied to the nose by a cotton-wool tampon or by using a spray.—(Journal des Praticiens, March 17, 1928, p. 169.)

The Treatment of Puerperal Sepsis by Hysterectomy.

B. Solomons points out that the field for the performance of hysterectomy in sepsis is limited. In an effort to formulate a plan for estimating the indications for hysterectomy, it seems to be a thing easier to say than to do. If hysterectomy were done as a routine, the percentage mortality would probably be small, but many uteri would be sacrificed unnecessarily; when the operation is done too late the results are fatal. How, then, can the *dies optima* be decided upon? The following symptoms and signs may be regarded as cardinal: The temperature and pulse-rate continue to be raised in spite of treatment; involution is arrested; subinvolution is accompanied by nodules or irregularities on the surface, which are pathognomonic of abscess formation or necrosis; in addition, a stinking discharge is present. A blood infection is a definite contra-indication to hysterectomy. Dr. Solomons gives details of two cases of puerperal sepsis treated by hysterectomy;

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harmful complications, but all the patients complained more or less of hyperæsthesia of the injected nerves for two to four weeks.—(*Journal of the American Medical Association*, April 7, 1928, p. 1099.)

The Effect of Parathyroid Extract in Infantile Tetany.

A. T. Shohl, A. M. Wakeman, and E. Y. Shorr have studied the effect of parathyroid extract on mineral metabolism in infantile tetany, small amounts of parathyroid extract being administered in two cases admitted to the New Haven Hospital. The drug had little effect on one infant, but the second case showed a control of the symptoms and an improvement as measured by clinical and chemical results. This improvement, however, disappeared when treatment was stopped. The alteration is brought about without gross changes in the calcium and phosphorus metabolism. During the period of administration of parathyroid extract with relief of symptoms, there was a normal excretion of sodium and potassium. During the relapse following withdrawal of parathyroid extract, the excretion of sodium increased and potassium was retained.—(*American Journal of Diseases of Children*, March 1928, p. 392.)

The Treatment of Myeloid Leukæmia.

P. Lecène and C. Aubertin are of opinion that in the treatment of myeloid leukæmia splenectomy does not modify the evolution of the disease, and therefore is not so effective as irradiation by X-rays. After a course of X-ray applications the blood picture is brought practically to normal for a longer or shorter period, while after splenectomy the blood picture is still that of a leukæmia. The authors give details of a case of myeloid leukæmia successfully treated by fifteen applications of X-rays followed by splenectomy.—(*La Presse Médicale*, January 14, 1928, p. 49.)

Manganese in the Treatment of Anæmia.

F. Faludi has successfully treated a considerable number of cases of secondary anæmia by the oral administration of a compound of manganese with albumen. He claims that the well-known effect of manganese in stimulating red blood cell formation is thereby obtained without any symptoms of gastric irritation or of toxic effects on the nervous system arising. A second group of cases was treated with the manganese-albumen compound combined with arsenic, and in every case a rapid improvement occurred, although previously lengthy treatment with arsenic alone had been tried without any appreciable result. Six cases of pernicious anæmia were also given manganese, but although five of these improved within a short time of its administration, there remains the possibility, as Dr. Faludi points out, that in so small a series the treatment was merely a casual factor in the remissions. In no case did any toxic symptoms appear during treatment, though the dosage was rather large. Each day for the first three days 0·3 gram (grs. v) was given, this being divided into three equal doses to be taken after meals; from the third day the dose was increased to 0·6 gram (grs. x), to be taken in the same way.—(*Deutsche Medizinische Wochenschrift*, March 23, 1928, p. 470.)

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both, the main features of the disorder are the shortening of inspiration and the great prolongation of expiration. It is suggested that in hiccough, as in asthma, the attacks are due to a disturbance in the relations normally existing between the innervation of the nasal mucous membrane and that of the diaphragm. By reference to two cases of severe hiccough, in one of which the attack persisted for three days, leaving the patient in a gravely collapsed condition, Dr. Lichtenstern shows that hiccough may not be dismissed lightly as of no consequence. In both his cases, after all other methods had failed, the attacks were stopped almost immediately by painting the nasal mucous membrane with a solution of adrenaline and cocaine:

R Cocaine hydrochlor.	-	-	-	-	-	} aa 1 part
Adrenaline (1-1,000 sol.)	-	-	-	-	-	
Acid. carbol. liq	-	-	-	-	-	gtt. I
Aq. dest.	-	-	-	-	-	to 50 parts

Success of this remedy, so often efficacious in controlling an attack of asthma, is held as evidence of the close relationship between these two types of dyspnoeic attack.—(*Klinische Wochenschrift*, March 18, 1928, p. 552.)

The Treatment of Fibrous Obstructions at the Neck of the Bladder.

C. W. Collings notes that bladder-neck obstructions may be of three types : (1) fibrous contracture and bar (congenital or acquired), (2) fibrous scar following prostatectomy, and (3) carcinomatous bar resulting from a carcinoma of the prostate. In the last four and a-half years he has relieved these conditions in 55 patients by the cutting high-frequency current. This current cuts instead of burning, and so leaves only a thin slough; the bleeding at the time of operation is unimportant, and there is no late secondary haemorrhage, hence the current may be applied through the endoscope without opening the bladder. The majority of the patients were given a caudal local anaesthetic (30 c.cm. of 2 per cent. novocaine); some required gas or spinal anaesthesia. The procedure changes the operative risk from major to minor, or the difference between a suprapubic cystotomy and a cystoscopy.—(*American Journal of the Medical Sciences*, April 1928, p. 485.)

The Treatment of Angina Pectoris.

J. C. White and P. D. White have treated five of the most severe cases of angina pectoris admitted to the Massachusetts General Hospital during a period of seven months by paravertebral alcohol injections given in the upper five intercostal nerves on the left side. Two patients showed complete relief from the left-sided anginal attacks, but had a continuance of mild to moderate crises on the uninjected side. Two others had their very severe attacks converted into milder and less frequent attacks. The fifth patient was apparently helped only for a few days. To date, the relief may be said to be valued at 90 per cent. in one case, 75 per cent. in one, 50 per cent. in one until his death nine months later from coronary thrombosis, 25 per cent. in one, and 0 per cent. in one. There were no

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Reviews of Books.

How to Make the Periodic Health Examination. By EUGENE LYMAN FISK, M.D., and J. RAMSER CRAWFORD, M.D. Pp. 393. London : George Allen & Unwin, Ltd. 20s. net.

IN this valuable book Dr. Fisk and Dr. Crawford have had the able co-operation and assistance of many well-known authors on the various subjects which come within its scope. The title alone suggests that such a work as this cannot limit itself to a few special aspects of medicine, but must embrace all branches of the subject. We congratulate the authors on having achieved this object. When disease presents itself one can within limits confine one's attention to the particular organ or system involved, but in the periodic examination of the apparently healthy individual a systematic and thorough investigation must be made of all the systems and organs. The largest and probably most important section of the book deals with "regional" examinations. Here, very ably dealt with, is a careful and detailed account of the best methods of investigating the various organs and systems of the body. It is in this section that the authors have benefited by the assistance of specialists in the particular branches discussed. The section dealing with laboratory methods and standards is clear, concise, and up to date. Under the heading "Counselling" the authors deal at length with the appropriate advice that should be given after the exhaustive periodic examination has been made. The book contains many useful charts and plates, and we are sure it will appeal to a great section of the profession.

Recent Advances in Medicine. By G. E. BEAUMONT, M.A., D.M., F.R.C.P., D.P.H., and E. C. DODDS, M.D., Ph.D., B.Sc., M.R.C.P. Fourth edition. Pp. 426, 48 illustrations. London : J. & A. Churchill. 12s. 6d. net.

THAT the fourth year of its publication should see the fourth edition of "Recent Advances in Medicine" is no more than a just tribute to the well-merited success of this excellent book. In point of fact, there is no other single volume which so adequately correlates the progress of modern medicine in the distinct, yet mutually dependent fields of clinical medicine, laboratory work and therapeutics. This edition contains certain additions to the chapter on the nervous system, including a detailed description of the intrathecal injection of lipiodol in the diagnosis of spinal cord compression, and also of the examination of the cerebro-spinal fluid by combined cisternal and lumbar puncture. On the therapeutic side considerations of the action of quinidine have been amplified ; a section has been written on the parathyroid glands ; and the latest method of administration of digitalis by "cat unit" tablets has been included. Additions to nearly every chapter bring the book completely up to date, thus making it invaluable to practitioners who, while anxious to keep up with modern medical thought, have little time in which to peruse the enormous amount of medical literature which is published.

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